The Electrical Industry's Weekly Magazine

February 24, 1958

Electrical World

Price 50 Cents

A McGraw-Hill Publication

138-kv Air-Blast Breakers Basic to Con Edison System Growth

.....Page 74

The Big Freeze Ups Power Output . . . p 62

E B POWER GS W
UNIVERSITY MICROFILMS I
313 N 1 ST
ANN ARBOR MICH

PRESENTING PAPER AT winter general meeting of AIEE are contributors to the study C. D. Galloway and A. G. Mellor (seated) of G.E., W. J. Pitcher, Dayton P&L, and L. K. Kirchmayer, G.E.

DEMONSTRATED IN JOINT DAYTON P&L—G-E STUDY . . .

New Computer Programs for Economic System Expansion

A valuable technique for studying a system's future generating units uses *probability methods* to forecast loss of load and capacity outages. *Probability methods* which involve thousands of calculations are possible using a medium size digital computer. The time required for the manual calculation of these functions has heretofore restricted the use of *probability methods*.

Data gained on capacity outage and loss of load is valuable in determining the most economical expansion of generating facilities. This pattern is derived from studying a number of possible expansion plans considering the following variables for each plan: investment for generation, investment for interconnection capacity, investment for internal transmission capacity, the cost of operation and maintenance, and the cost of fuel for each of the generating units.

In the joint study made by Dayton Power and Light and G.E., three expansion patterns were studied: one, adding 15% of the system capacity in new generating facilities; two, adding 20% and, three, adding 25%. The cost for a 15% expansion was 1-2% less than the 20% expansion cost and 3-6% less than the 25% expansion cost, assuming a tie capacity equal to the size of the largest unit and a maximum loss-of-load probability of three days in 10 years.

General Electric Analytical Engineers who evolved these techniques feel that the study with Dayton Power and Light demonstrates the combination of *probability methods* together with automatic digital computation is a useful tool for the examination of economic generator unit size. The flexibility of the digital computer programs developed for this type of study and the speed of the computer allows for rapid examination of the effect of changes in various assumptions.

To find out how this method may be applied to a study of your system, contact your local Apparatus Sales Office. General Electric Co., Schenectady 5, N.Y.

301-379

COST IN % OF 15% EXPANSION PATTERN*

Alternate #1: 70% interconnection instead of 100%
Alternate #2: 6 days loss of load probability instead of 3 days/10 years
Alternate #3: 5% year load growth instead of 8.9%
Alternate #4: 0 inflation instead of 3.5%

Expansion Pattern	Base Case	Alt. #1	Alt. #2	Alt. #3	Alt. #4
(a) 15%	100	100	100	100	100
(b) 20%	102	104	99	101	102
(c) 25%	105	108	103	103	106

*present worth of annual cost of (1) investment for generation (2) interconnection capacity (3) intraconnection (4) operation and maintenance (5) fuel.

LIVE BETTER ELECTRICALLY

MORE POWER TO AMERICA

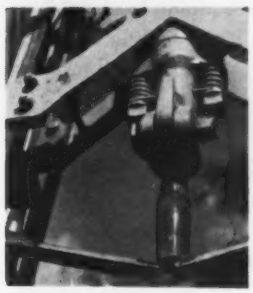
GENERAL ELECTRIC

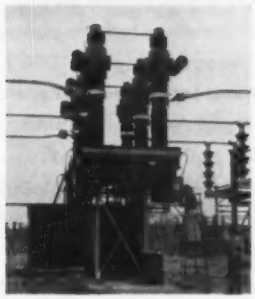
Electrical World

Vol. 149, No. 8 FEBRUARY 24, 1958

Published for 84 years for those engaged in the business of generating, transmitting, distributing, or applying electric power

In This Week's Issue





CURRENT EVENTS

Cold Spell Perks Kwhr Output

Blizzard in north, arctic air in south drop mercury; furnace loads jump—temporarily .....p 62

Contrasts Mark NRECA's Annual Meeting

"Stand your ground" theme of Co-ops' convention in Dallas could be changed to "full steam ahead" .....p 68

Doble Shows New Oil Power Factor Tests

Procedure permits evaluation of an oil's chemical characteristics by electrical measurements .....p 73

DISTRIBUTION

Paper Additive Improves Insulation

J. G. Ford, M. G. Leonard, Westinghouse Electric Corp

Amine stabilizing compound inhibits deterioration, and tolerates operation at higher temperatures .....p 80

New Rig Speeds Ground-Rod Driving

H. L. Allen, Florida Power & Light Co

It is fast, efficient, and mobile method of driving rods 30-ft down through coral rock .....p 78

SUBSTATIONS

138-Kv Air-Blast Breakers Basic to Growth

T. D. Reimers, Consolidated Edison Co

Con Edison uses new, larger air breakers as building blocks to meet forecasted system load .....p 74

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POWER PIPING FIRSTS

that have made Kellogg the pacemaker

As steam turbine operating pressures and temperatures have increased over the past 25 years, The M.W. Kellogg Company has continued to set the pace in power piping design, fabrication, and erection. Many of the developments which have brought the central power station to its present efficiency may be traced to the laboratory or shop techniques developed or first put to use in the industry by Kellogg.

Among Kellogg's many "firsts" of a general nature, listed in chronological order, are:

- *Forge and hammer welding of intermediate joints and branch connections in the United States*
- *Bare wire electrode welding in the shop*
- *Coated electrode welding in the shop*
- *Shop-corrugated super-flexible pipe*
- *Streamlined forged fittings*
- *Development of an integrated analytical solution for piping flexibility analysis to include multiple anchor and intermediate restraint problems*
- *Use of inversion procedures for piping flexibility analysis*
- *Development of model testing method for solving piping flexibility procedures*
- *Evaluation of stress range concept and fatigue basis for flexibility design*
- *Development of material specifications for C. ½% Mo. pipe having #3-#5 actual grain size to give optimum strength at high temperatures*
- *Kelcaloy bi-metallic transition or "K" pieces to join ferritic to austenitic piping*

Kellogg's "firsts" in the fabrication of power piping, listed at the right, are even more numerous. Kellogg welcomes the opportunity to discuss its complete facilities with consulting engineers, engineers of power generating companies, and manufacturers of boilers, turbines, and allied equipment.

FABRICATED PRODUCTS DIVISION

The M. W. Kellogg Company

711 THIRD AVENUE, NEW YORK 17, N. Y.

A SUBSIDIARY OF PULLMAN INCORPORATED

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FIRST IN FABRICATION OF:

- Piping from C. ½% Mo.
- Station piping for 900 F.
- Station piping for 950 F.
- Station piping for 2200 psi.
- C. ½% Mo. piping with #3-#5 actual grain size
- 1¼% Cr.-½% Mo. steam piping
- Steam piping for 1000 F.
- ½% Cr.-½% Mo. station piping
- 2% Cr.-½% Mo. station piping
- Station piping for 1000 F.
- 2¼% Cr.-1% Mo. station piping
- 1¼% Cr.-½% Mo. station piping
- 1% Cr.-1% Mo. V. turbine piping
- 2¼% Cr.-1% Mo. V. station piping
- Station piping for 1050 F.
- 3% Cr.-1% Mo. station piping
- Type 347 stainless turbine piping
- Mercury vapor piping for 1000 F.
- Station piping for 1003 F. for France
- Type 347 stainless station piping
- Station piping for 1100 F.
- Type 316 stainless station piping
- Type 316 stainless station piping for 3500 psi-1050 F., 325 MW.
- Type 316 stainless station piping for 5600 psi-1200 F., 325 MW.

POWER PIPING—THE VITAL LINK

Electric Automobiles! Why Not?

To keep the electrical output growing at the long term rate it now appears that two things must be done. First, all types of electrical applications must be promoted as never before. This is obvious from the success of the gas industry and the automotive industry in taking business away from the electrical industry in the past two years. The second factor is the urgent need for new electrical devices to create new markets and therefore new electrical rates.

Mr. H. Drake Harkins, a registered professional engineer and a director of the Atlantic City Electric Co, 3037 Harbor Drive, Ft. Lauderdale, Fla, has produced an interesting brochure entitled "The Electric Automobile—Now Possible—Benefits For You." Mr. Harkins points out that electric utilities can gain a wonderful off peak load through this electric automobile. He estimates that two hundred thousand autos could provide a revenue of eight million dollars a year to electric utilities through off peak recharging. Let's hope that someone will cultivate this idea.

Fischer Black

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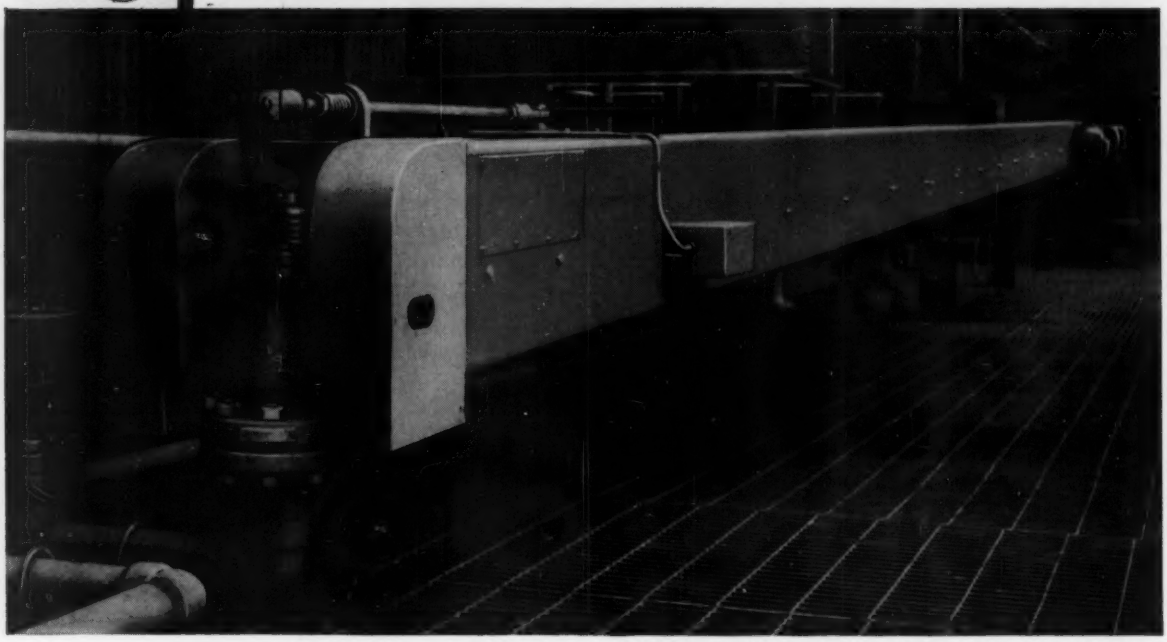
How Copes-Vulcan control systems boost power plant efficiency



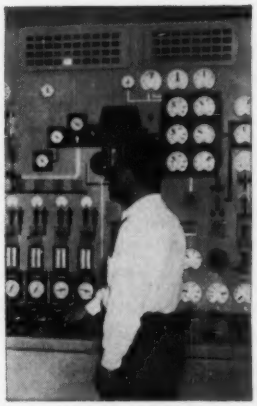
38-foot travel with this Vulcan T-30 on a 1400-psig utility boiler. Write for Reprint 1040, the story of this interesting installation.

Vulcan soot blowers clean widest furnaces ...simplify maintenance

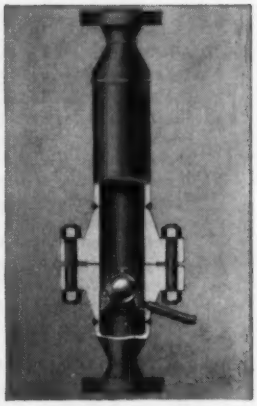
Vulcan long retractable soot blowers are products of years of experience in the utility field. A dual-motor drive permits one motor to extend and retract the lance, another to rotate it. This provides an infinite number of multi-helix jet patterns for *complete* coverage, *uniform* cleaning.

Built to withstand outdoor installations in all climates, these soot blowers feature simplicity of working parts to assure dependable operation with a minimum of outages for servicing.

One source ... one responsibility ... a complete service. Besides boiler cleaning equipment, Copes-Vulcan builds complete control systems for combustion, feed water, superheat and reheat temperatures, feed water bypass, pressure reducing and desuperheating. Whether furnished separately or integrated into a single package, each installation is custom-designed for the specified conditions. Write for Bulletin 1022-B.



Combustion control for every need. Copes-Vulcan combustion control adapts to all generating capacities, load ranges, pressures and fuels. Write for Bulletin 1032, the story of a utility installation featuring compact panel with miniature instruments.



Desuperheater improves temperature control. New Copes-Vulcan Variable-Orifice Desuperheater holds reduced steam temperature constant only twenty feet downstream from desuperheater outlet, even over a 50-to-1 load range. Write for Bulletin 1037.

Copes-Vulcan Division
BLAW-KNOX COMPANY
Erie 4, Pennsylvania

BK-4410

Rely on Graybar . . .

ESPECIALLY IN EMERGENCIES

Graybar's long experience in serving the everyday needs of utilities is especially valuable when lines go down.

A nation-wide network of Graybar offices and warehouses provide ready accessibility of poleline supplies. You can depend on the fastest possible deliveries of emergency replacement items —wherever and whenever they are needed.

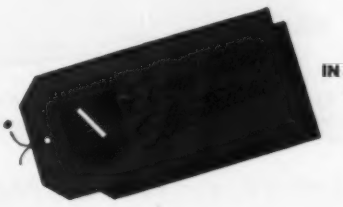
Experienced Graybar personnel have developed the know-how needed to initiate immediate action and efficient follow-through from working closely with utilities daily and through emergencies of all kinds.

Moreover, Graybar is totally owned by its operating and retired personnel. That's why you're sure to get, especially in emergencies, *personal* service from people who have a *personal* interest in giving you the assistance you need, when you need it.

619-92

Graybar Electric Company, Inc.
420 Lexington Avenue, New York 17, N. Y.

Call Graybar first for...



IN OVER 130 PRINCIPAL CITIES

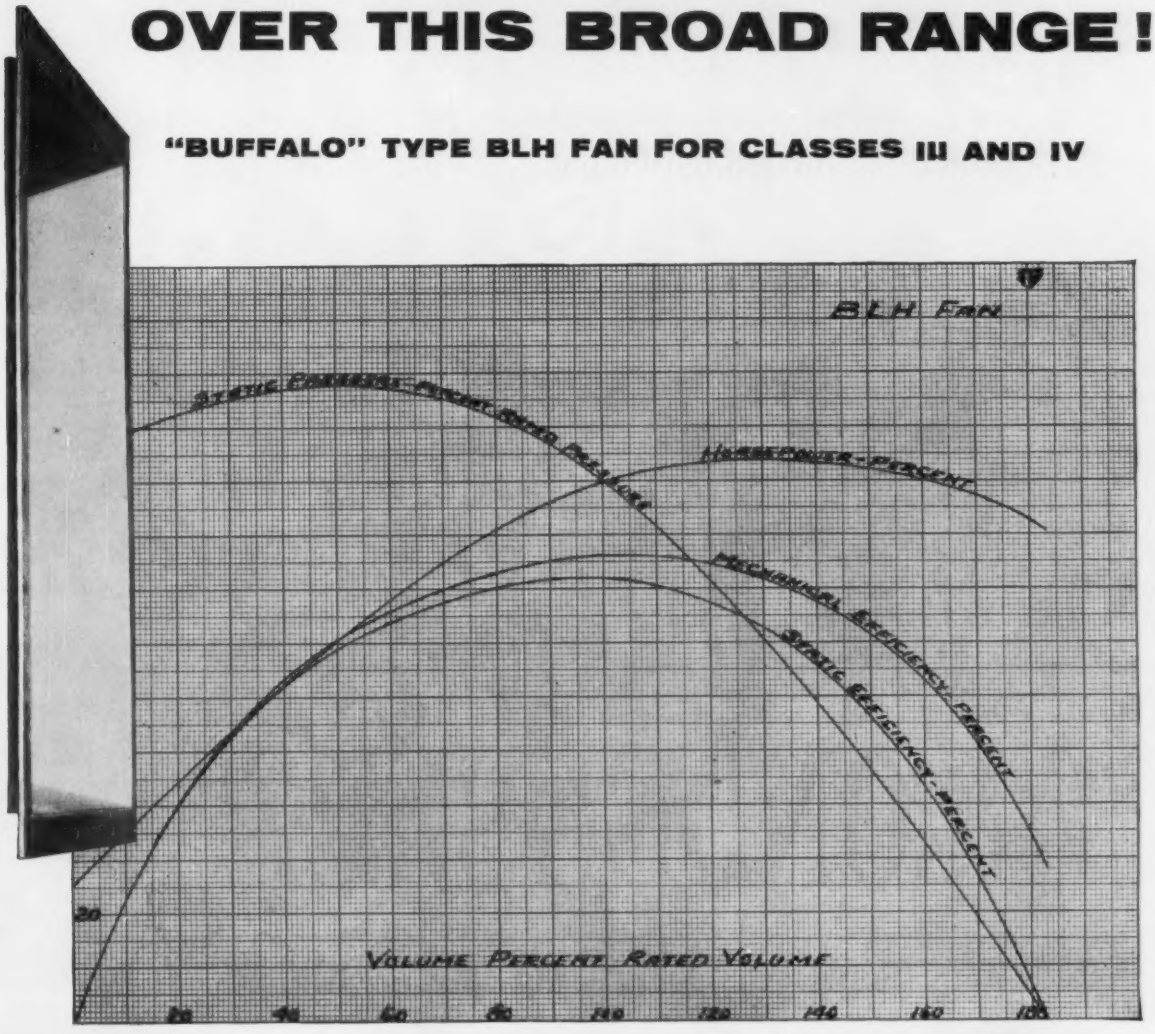
A NEW HIGH IN

"Buffalo" Type BLH Fan for high pressure air moving. Its efficiency is due to advanced rotor, inlet and outlet features developed exclusively by "Buffalo".

VENTILATING AIR CLEANING AIR TEMPERING INDUCED DRAFT

FORCED DRAFT EFFICIENCY OVER THIS BROAD RANGE!

"BUFFALO" TYPE BLH FAN FOR CLASSES III AND IV



If peak efficiency, along with durability and servicability, are important to you in a forced draft fan, the BLH deserves your closest investigation.

Note the broad curve of mechanical efficiency above — 80% or better from 65% to 135% of rated volume — permitting flexibility of operation. This performance has been achieved through inlet-to-outlet streamlining — a smooth inlet bell, cantilevered inlet vanes, backward curve blades, specially curved rotor flange and divergent outlet — minimizing turbulence at every point to give air the smoothest ride ever. And the new "Buffalo" Variable Inlet Vanes can be substituted for the stationary inlet vanes for smooth draft control with no performance loss in open position.

The BLH is one of a complete *series* of "Buffalo" Draft Fans available to meet your draft requirements exactly, with no guess work and no compromise. Write for Bulletin F-200 and recommendations on your problem.

"Buffalo" Cantilevered Variable Inlet Vanes have no center ring to cause entry loss, and the control mechanism is out of the air stream, assuring smooth volume control without sacrificing fan performance.

"Buffalo"

BUFFALO FORGE COMPANY

BUFFALO, N. Y.

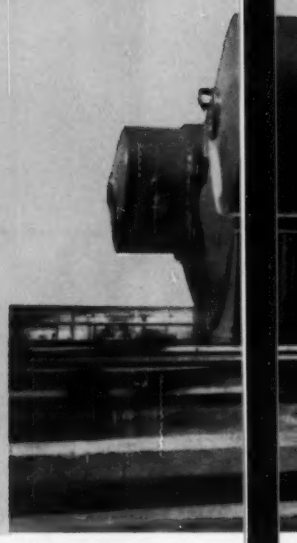
Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

EXHAUSTING FORCED DRAFT COOLING HEATING PRESSURE BLOWING

Sentinels of National Defense

SIX ELLIOTT SYNCHRONOUS CONDENSERS

Help Guard Portsmouth AEC Power System



Engineered to meet application requirements

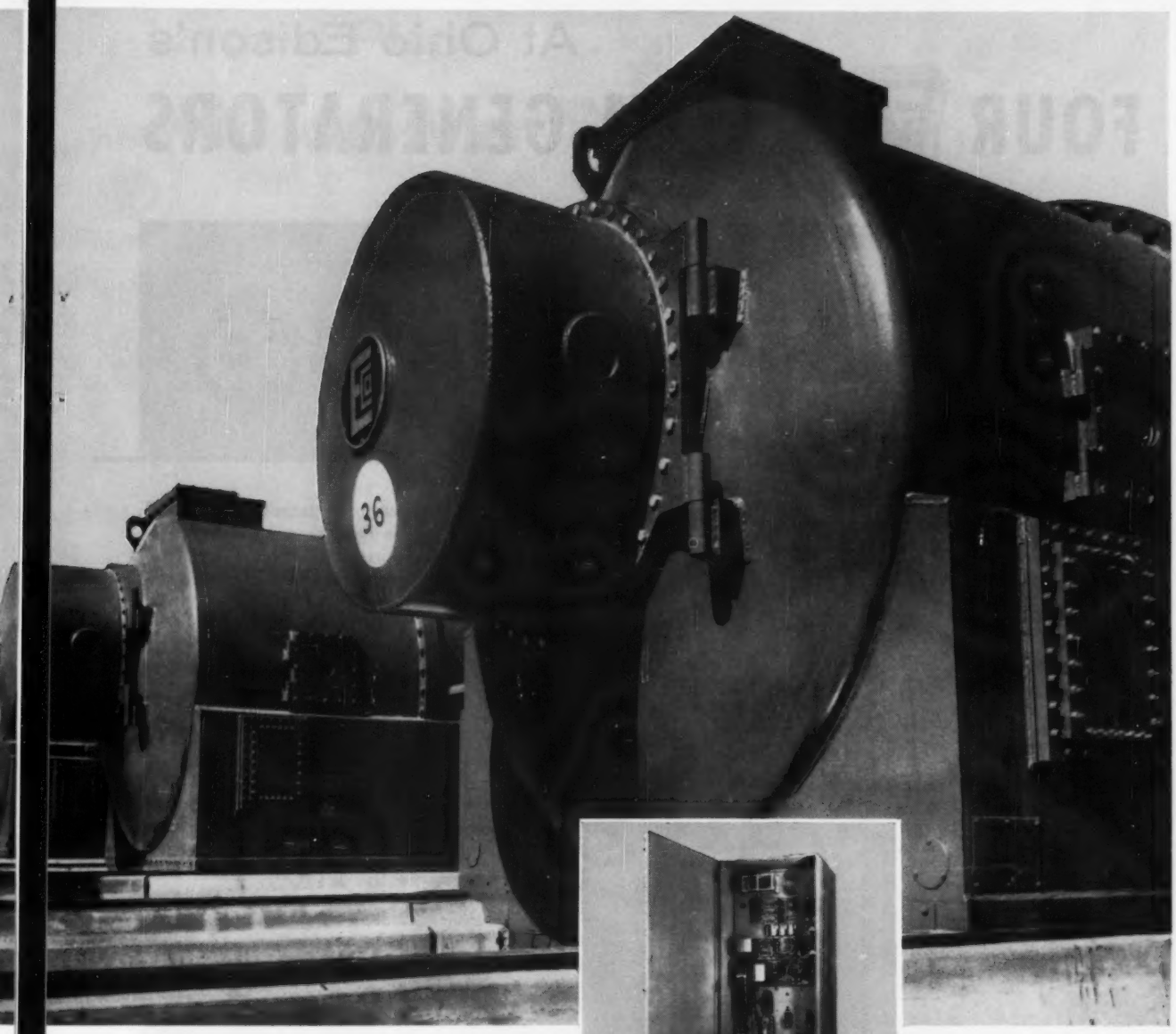
Handling 1,950,000 kw plus a big reactive kvar load at the same time means problems in anybody's plant. At the Atomic Energy Commission's Portsmouth Area Plant, it means maintaining electrical system stability at all costs . . . guarding against voltage changes under both steady and transient conditions.

Six Elliott 25,000-kva hydrogen-cooled condensers are lined up and on duty here, serving AEC's critical needs. To equip the condensers for their task, Elliott engineered and supplied starting controls, voltage regulators, and synchronizing controls.

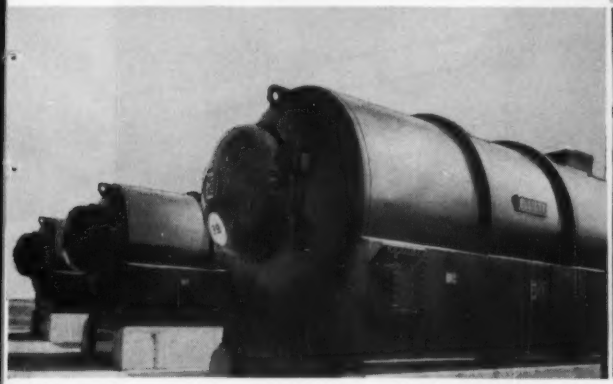
The six Elliott condensers are the highest speed and smallest in physical size of this rating ever built in salient pole machines. They are elevated 22 feet above ground level, and all control cables, bushings, etc., come out the bottom of the condenser housing. The hydrogen and CO_2 gas control cubicles are outdoor type.

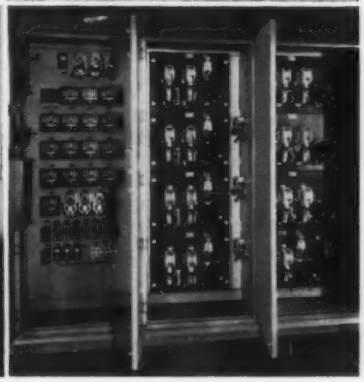
Construction details illustrating how Elliott synchronous condensers are built to withstand severe operating conditions are described in Bulletin PB 5800. For assistance in solving your particular application problem, call your nearby Elliott District Office or write Elliott Company, Ridgway Plant, Ridgway, Pa.

ELLIOTT Company



Three of the six Elliott 25,000-kva, 13.8-kv synchronous condensers, viewed from the exciter end, are seen above. An interior view of the Elliott-engineered condenser excitation cubicle is shown on the right.





On the left, are three of the Elliott synchronous condensers viewed from the starting motor end. Next to these is an interior view of the Elliott-engineered starting equipment for the starting motors.

RB-6

At Ohio Edison's FOUR FW STEAM GENERATORS

To keep ahead of the large-scale industrial growth in central and northeastern Ohio, the Ohio Edison Company is embarked on a series of additions and expansions in its generating capacity. One of these is the new Stratton Station which is now under construction at Stratton, Ohio, on the Ohio River. When completed in 1961, this will be the largest steam plant in the Ohio Edison system.

When ground was broken for the Stratton plant in May, 1956, two steam-electric generating units, each with a capacity of 170,000 kw, were scheduled for installation. As more and more customers announced further plans for expansion, the contemplated plant size was doubled to include four such units, with a total generating capacity of 680,000 kilowatts.

Pouring of concrete for the plant building commenced a year ago, with steel erection

Largest Plant,

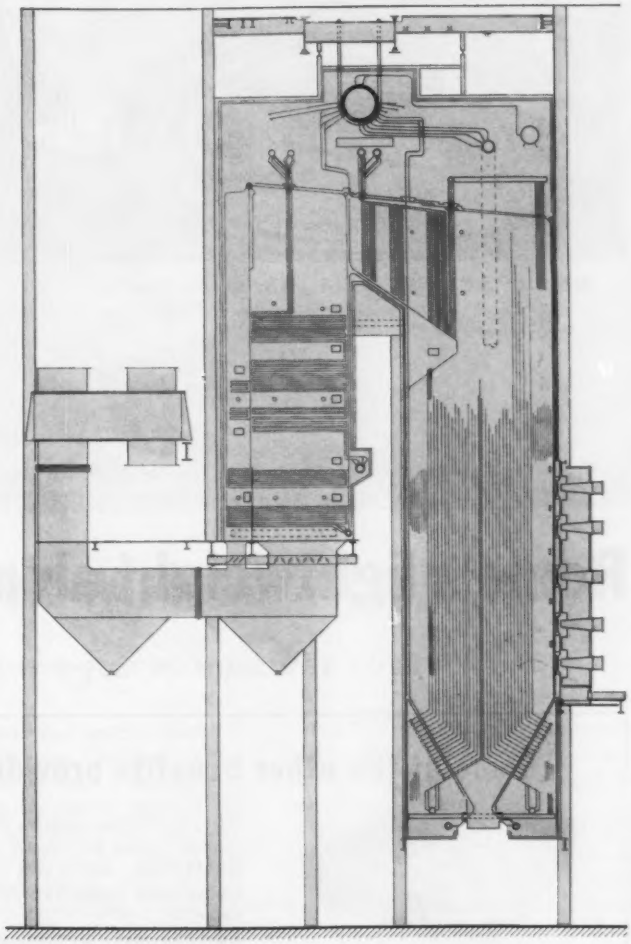
will deliver 5,000,000 lb/hr

New Stratton Station, now under construction, will have capacity of 680,000 kw by 1961— with four 170,000 kw units, each served by a FW 1,250,000 lb/hr Reheat Steam Generator

beginning last August. The first turbo-generating unit is scheduled to go into service late this year — the second next year, the third in 1960 and the fourth in 1961.

Steam for all units at Stratton Station will be supplied by four Foster Wheeler reheat steam generators with a combined capacity of five million pounds per hour. Each of these FW boilers will have a normal capacity of 1,250,000 lb/hr at a pressure of 2450 psig (2700 psig design) and a temperature of 1050 F at the superheater outlet. The reheat flow will be 1,040,000 lb of steam per hour at 430 psig and 1000 F.

With more than a half-century of experience in steam generation — and the finest modern manufacturing facilities in three large plants — Foster Wheeler welcomes the opportunity to quote on your requirements. *Foster Wheeler Corporation, 666 Fifth Avenue, New York 19, N. Y.*



Architect's conception of the completed Stratton Station plant of Ohio Edison. Ground was broken for the plant in May, 1956. When the last of four units is installed at Stratton Station in 1961, it will have the largest capacity in the Ohio Edison system.

Cross section of reheat steam generator for Ohio Edison's Stratton Station. Four of these units have been ordered for the 680,000-kw plant. Each unit will supply 1,250,000 lb of steam per hour at 2450 lb/sq in. pressure, 1050 F primary steam temperature and 1000 F reheat temperature.

FOSTER WHEELER

NEW YORK • LONDON • PARIS • ST. CATHARINES, ONT.

Easier to Handle. The lightweight construction of Rome's aluminum Triplex makes it easier to handle and quicker to install than open-wire drops.

Neater Appearance. This self-supporting service drop cable offers neat appearance of a single cable assembly compared to open wires.

Rome's lightweight aluminum Triplex goes up

Some of the other benefits provided by this service cable

The construction features of Rome's aluminum Triplex lead to still more savings:

Costs less. Initial cost is lower than conventional copper Type SD service drop cable.

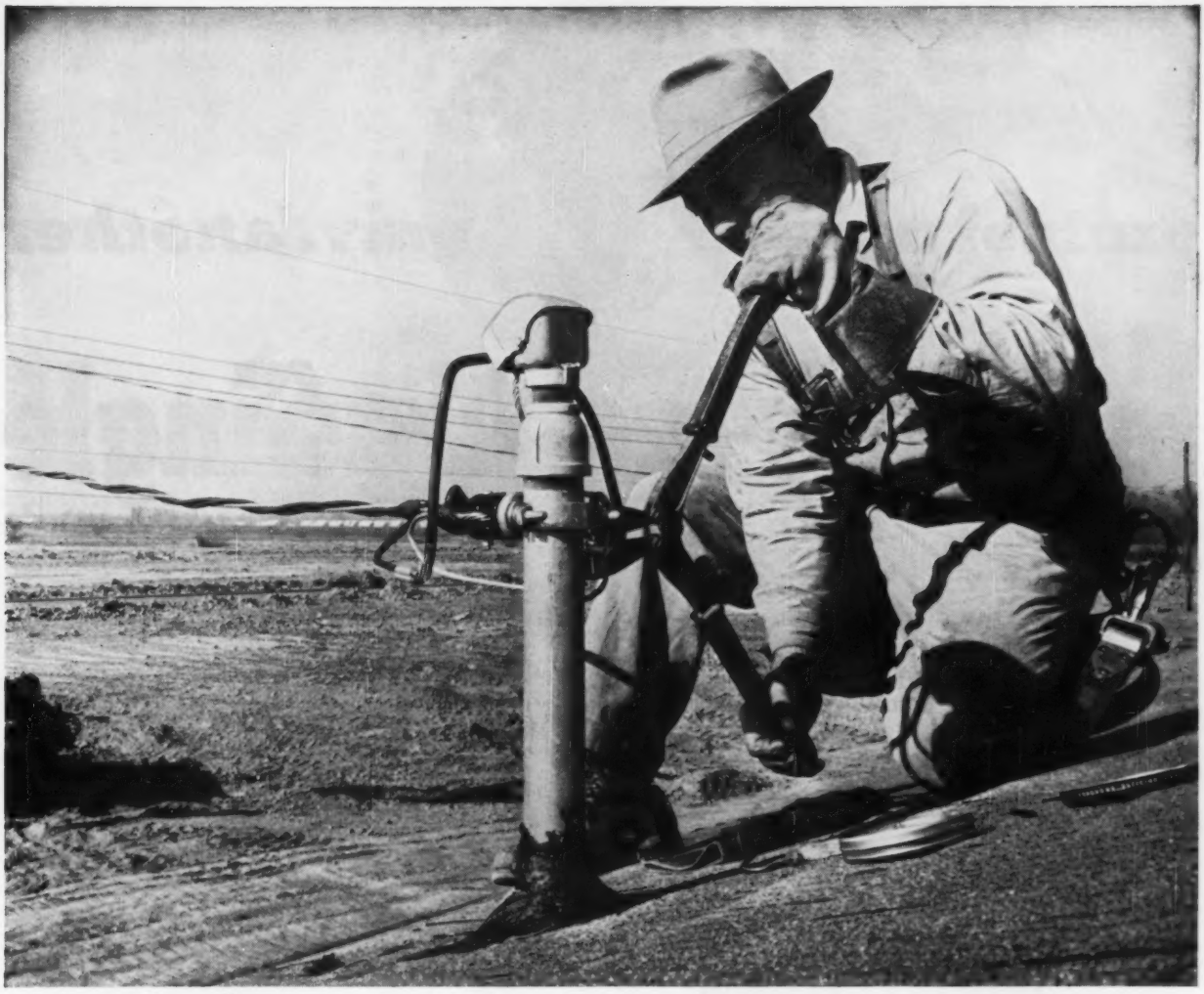
Lasts longer. Maintenance and service interruptions are few compared to open-wire installations. It offers maximum resistance to storms, wind, and ice loading.

Fewer poles required. Fewer poles are required and longer spans are possible with mid-span taps on secondary Triplex.

Less hardware needed. Service tap connections at the pole require less hardware than a conventional three-wire tap.

You have a choice of Roprene (neoprene) or Rolene (polyethylene) insulation. Either one withstands the severe effects of sunlight, heat, moisture, corrosive atmosphere, and other common hazards.

Specify Rome's aluminum Triplex for your next job. Contact your nearest Rome Cable representative for more information —or write to Department 366-A.



much faster than open-wire service drops

That means real savings in on-the-job manpower costs

Reduce your service-drop installation time—even by a few minutes—and you save money. Now it's possible to speed up practically every job.

High dollar savings. Rome's aluminum Triplex can be installed much faster than open-wire service drops. Multiply the time it saves by the high cost of keeping your crew on the job, and you'll see how great the savings are in manpower costs alone.

Why such savings are possible. The lightweight construction of Rome's aluminum Triplex is behind these important savings. This single cable assemby weighs less than conventional copper three-wire service drops, so it's easier to handle and quicker to install.

Rome's aluminum Triplex offers simplicity in construction. A self-supporting cable, it consists of specially insulated power conductors spiralled around a "straight-away" neutral conductor. Less handling is required to pull it off the truck, string it, and connect it than conventional three-wire service drops.

You can purchase this economical service drop cable in handy 500-foot cartons, paper-wrapped coils, or on non-returnable reels.

Specify Rome's aluminum Triplex for your next job. Contact your nearest Rome Cable representative for more information—or write to Department 366-A and ask for Bulletin RS-5. Rome Cable Corporation, Rome, New York.

ROME CABLE
CORPORATION

...another The *Exclusive* Single

Saves Space

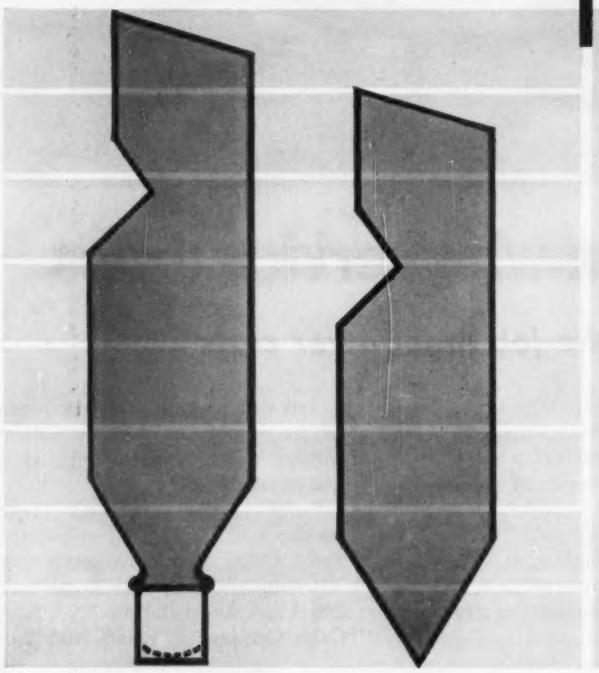
Reduces overall height of structure. Permits higher capacity in restricted area.

Adaptable to

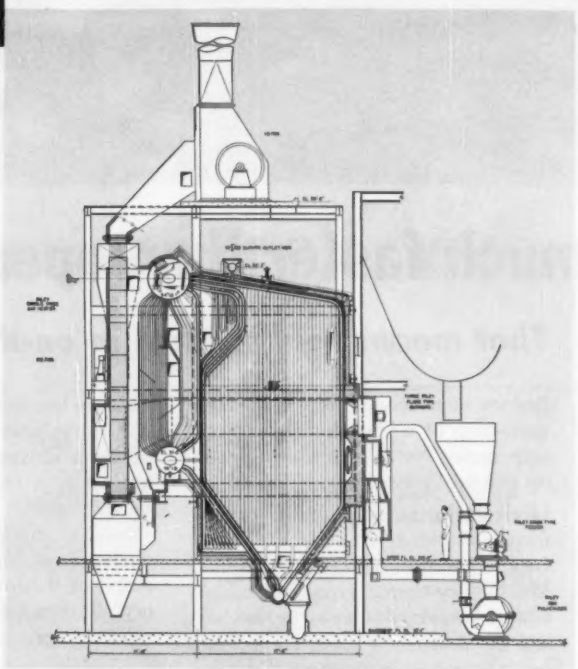
High capacity central station type units

and to

Small industrial type units



Unit with hopper added. Single Header Hopper Unit.

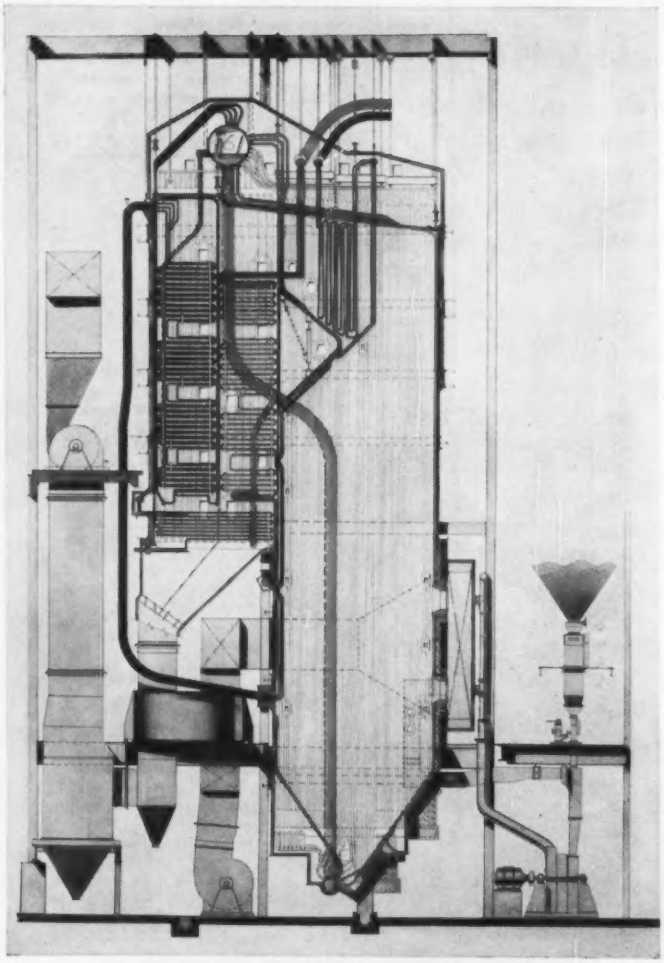


A 60,000 lbs/hr industrial type unit with Single Header Hopper

A survey of your plant by qualified consulting engineers could show ways of making surprising savings in your power costs.

money saving RILEY design feature

Header Hopper Bottom



A large Riley public utility reheat unit with Single Header Hopper

The Riley Single Header Hopper is so called because the furnace wall tubes are used as the sloping sides of the hopper and connect to a single header at the bottom. This simple arrangement eliminates the space required to install a separate ash hopper, thus reducing the overall height of the unit and permitting a unit of higher capacity to be installed where head room is a limiting factor. Additional savings are realized in the elimination of hopper seals and their maintenance.

Riley units with Single Header Hopper Bottoms are especially suited to multiple fuel firing and are extremely successful with coals of low ash fusion temperature. If installed initially to burn either coal or gas, coal can be burned at any time; a simple hydraulic or pneumatic ash removal system can then be added.

Riley Single Header Hopper Bottom Units are furnished in any steam capacity, temperature and pressure.

It will pay you to investigate further the economies possible in this exclusive Riley design feature.

RILEY

STEAM GENERATING & FUEL BURNING EQUIPMENT

Riley Stoker Corporation, Worcester, Mass.

Atlanta, Buffalo, Charlotte, Chicago, Cincinnati, Cleveland, Detroit, Houston, Kansas City, Los Angeles, New Orleans, New York, Philadelphia, Pittsburgh, Portland, St. Louis, St. Paul, Salt Lake City, San Francisco, Seattle, Worcester.

here's a fuse link that clears faults itself

especially needed for high interrupting capacity cutouts at 12 kv and above

In years past, distribution at 4 kv and below was the rule, and the faults were low. The interruption of short-circuit current was relatively easy, not only because the circuit voltage was low but because the maximum duty imposed on a distribution cutout was low enough to permit the use of small bore fuse tubes. And these small bore tubes gave fairly sure circuit interruption over the entire fault current range.

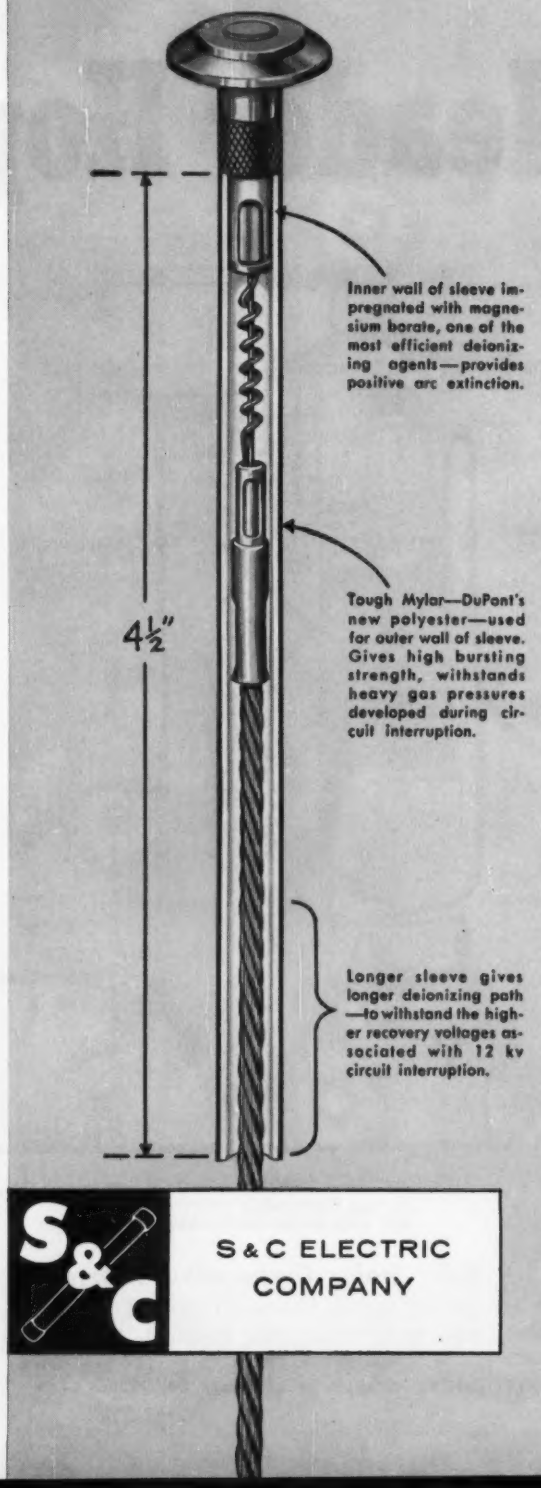
Today, circuit interruption is a lot tougher. Because of the high short-circuit currents, cutout manufacturers have increased, or should increase, the fuse tube bore diameter to minimize blast violence and to retain single-vented operation with its inherently safer *exhaust* behavior. And yet, when fused with conventional fuse links, such large bore cutouts can't reliably interrupt low-to-medium faults.

The result has been that the user has had to choose between: (1) A large bore cutout that couldn't positively clear the lower faults, hence requiring a momentary feeder outage by putting this duty on the back-up recloser and breaker while the cutout dropped open to isolate the fault, or (2) a small bore double-vented cutout that is inherently dangerous.

This new S&C Positrol Fuse Link makes the choice easy and obvious. By itself—and regardless of cutout design—it gives positive interruption of low and intermediate faults. With fault currents of 800 amperes and lower, this S&C Fuse Link acts positively as a dependable interrupting device at 12 kv. The illustration shows why.

Of course, at higher faults, the cutout takes over the interrupting duty.

S&C Electric Company, 4421 Ravenswood Ave., Chicago 40, Ill. In Canada: S&C Electric Canada, Ltd., 8 Vansco Road, Toronto 14, Ont.


4½"
Inner wall of sleeve impregnated with magnesium borate, one of the most efficient deionizing agents—provides positive arc extinction.
Tough Mylar—DuPont's new polyester—used for outer wall of sleeve. Gives high bursting strength, withstands heavy gas pressures developed during circuit interruption.
Longer sleeve gives longer deionizing path—to withstand the higher recovery voltages associated with 12 kv circuit interruption.

S&C ELECTRIC COMPANY

The Electrical Newsletter

FUTURE NEWS ▶ **Watch for concerted drive in Congress to reverse Ike's policy** of no "new starts" on federal water and hydro projects. Probable theme of drive: need for this type development in Sputnik age.

Congressional emphasis this year will be on big nuclear reactors. Reason: Democrats will point to international prestige Britain gained by announcing 500-Mw reactor.

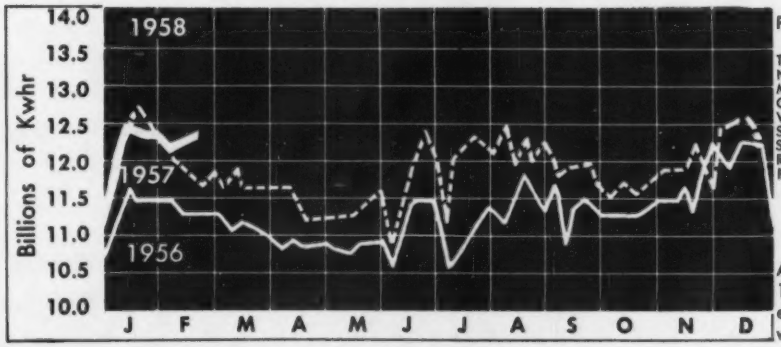
LATE NEWS ▶ **Will 'Live Better Electrically' be adopted into the EEI family?** Consideration is being given it. First big decision will be taken before EEI's Commercial Division executive committee at the '58 annual sales meeting in March. Added thought: Three big New York ad houses have submitted presentations for future LBE campaigns.

Consolidated Edison Co of New York and UWUA agree to a package increase (wages and fringes) of 38.4¢ an hour, or $17 million. Contract will run from March 1 to Dec. 1, 1959. Wages will rise 17.5¢ an hour on March 2 for all manual and clerical workers and manual workers get 5¢ an hour hike next Nov. 30. A total of $600,000 will be set aside for wage adjustments.

Georgia Power wins National Safety Council's first place award for major utility. It had record of 1.6 disabling injuries per million manhours in 1957, compared with a 21-company average of 4.57 per million manhours.

Management changes . . . Washington Water Power elects G. M. Brunzell executive VP . . . F. M. Jennings becomes manager-engineering and construction for Iowa Southern Utilities . . .Philip D. Reed announces retirement as chairman of General Electric, but seeks post as chairman of the finance committee for coming year.

Power Output—Up 3.9% (Week ending Feb. 15), Kwhr 12,417,000,000



Per Cent Change From Previous Year

	Feb. 1	Feb. 8	Feb. 15
Total U.S.	−0.7	+2.2	+3.9
New Eng.	+0.7	+1.9	+2.4
Mid. Atlan.	−1.7	+0.9	+3.1
Cent. Ind.	−3.1	−1.8	+0.6
West Cent.	−1.2	+1.8	+7.3
Southeast	+5.0	+10.0	+8.4
South Cent.	−0.3	−0.1	+3.6
Rocky Mount.	0.0	+2.1	+0.8
Pacific			
NW	−7.7	+1.5	+4.8
SW	−1.4	+0.6	+3.7

Seasonally Adjusted Index 234.9

Week Ago 231.4 Year Ago 225.6

Atomic Energy Commission requirements—1,050,000,000 Kwhr (Electrical World estimate). Excluding AEC, output increase was 5.3%

A TWO-MINUTE PREVIEW OF THIS ISSUE

EVENTS ▶ **Snow, winds, and bitter cold brought record output peaks** to at least three utilities as winter laid an icy hand on half the nation. Output was up throughout most of the East despite lagging industrial production. EW's survey of the cold wave's effects on utilities appears on **p 62.**

Clyde Ellis charged Pres Eisenhower with "double cross", warned of "grave peril" to rural electrification at NRECA convention in Dallas. More than 6,000 "embattled" delegates hear REA act assailed, TVA revenue bill promoted. Administrator Hamil says rural systems' net worth has doubled since 1952 **(p 68).**

Long-standing feud between Nebraska public power groups ended Feb. 1 as Nebraska Public Power System and Consumers Public Power District reached agreement on "the closest thing to an integrated one-system operation, but still retaining the identity of the various agencies." Both groups will now push together for federal power from the Missouri Basin **(p 71).**

Closed-circuit TV direct from the laboratory brought 300 clients of Doble Engineering Co up to date on insulating oil testing. Scene: Doble's 25th annual clients conference in Boston **(p 73).**

WASHINGTON ▶ **Electric companies can no longer deduct contributions** to certain ads as a business expense in corporate income tax returns. This ruling came last week from Internal Revenue Service, following Sen Kefauver's recent probe of utility advertising. Involved are ads sponsored by the Independent Electric L&P Cos and ECAP. Pennsylvania P&L Chairman Charles E. Oakes replied that advertising to meet competition is a proper business expense. Said Oakes: "It should make no difference whether the competition is from other business enterprise or from the federal government" **(p 65).**

SUBSTATIONS ▶ **Con Ed designers have an eye on future 6,000-Mw system peak** as they plan substations. 138-kv, 10,000-Mva air-blast breakers and 13.8-kv magnetic air breakers are part of their answer; new 138-kv air-insulated metal-clad bus is another. To find how Con Ed puts the pieces together, turn to **p 74.**

DISTRIBUTION ▶ **Amine-impregnated paper** for insulating distribution transformers, plus a synthetic wire enamel which the amine won't affect, adds up to longer transformer life, higher thermal limit **(p 80).**

CONSTRUCTION ▶ **Straight through 30 ft of coral rock** go ground rods driven by Florida P&L's jeep-mounted air hammer. The driving rig is fast and mobile, cuts costs of lightning protection **(p 78).**

RATES & REGULATION ▶ **Rate action steps up** and total hikes for 1958 may hit $100 million, as "earnings squeeze" hits many electric utilities. Here's a roundup of this year's action . . . First rate increase since 1920 for Housatonic PS fills half the bill . . . Empire District gets go-ahead from Missouri and Kansas . . . Montana-Dakota Utilities plans appeal as North Dakota says "No!" (p 99).

ORGANIZATION ▶ **Form follows function at Commonwealth Ed.** Main office keeps a firm rein on some tasks, farms out others to divisions. The yardstick: Whatever organization works best, use it! (p 66).

TAXES ▶ **What's this? Officers' salaries in plant account and income statement?** Internal Revenue Service has apparently not disputed the practice, and it nets the utility higher current earnings and a gain in free use of deferred taxes. Here's how it can help your company (p 64).

INDUSTRIAL ▶ **Electrification of a 60-year-old foundry boosted output 400%** for Union Iron Works in Spokane, Wash. New arc furnace, automated equipment also cut costs and improved product . . . A timely tip on electric pumping kept a customer bottling his Pennsylvania spring water electrically (p 90).

SELLING ▶ **Better Light Better Sight Bureau draws more cooperation** from utilities as 71 back its Teaching Aid plan in first month. Schoolbook covers help spread the word on eye care, as utility posters remind: "Only 2 to a Customer." Union Electric's Robert L. Coe urges an alliance with optometrists (p 87).

MANUFACTURERS ▶ **Shorter network transformers** in a new line from General Electric Co promise savings in vault construction . . . Allis-Chalmers' synchronous condenser features hydrogen cooling of both stator and rotor coils (p 108).

NEW EQUIPMENT ▶ **Light-weight aluminum quadrant clamps** are designed for distribution and station deadends . . . Computer language translator converts data from cards or punched tape to magnetic tape, or back, in a matter of seconds . . . Snow tractor mushes through deep snow on line patrols (p 92).

PEOPLE ▶ **Sherman Chickering** becomes a vice president of San Diego Gas & Electric Co, filling the vacancy caused by his father's recent death . . . Elmer A. Rothfus will fill the newly created position of chief electrical engineer for Ohio Edison Co . . . Montana Power Co names William D. Eminger superintendent of generation . . . Iowa L&P Pres Sutherland Dows historical hobby helps spur area development (p 112).

Recent trend of using electric arc furnaces for copper refining is typified by American Smelting and Refining Co's new facility. By preheating copper in an oil-fired furnace Asarco claims optimum thermal efficiency of both types of energy inputs even with electric power cost of 1 cent per kwhr. Secret of success is close control of process. Rotary regulator and controls are used to actuate a hydraulic servo control system. —Chemical Week, Jan 25, 1958.

Measuring accuracies to 3% can be obtained for thicknesses of 0.027 to 4 in. with an ultrasonic gage. Sweep-frequency sensing system and direct-reading indicator assembly measures thickness ultrasonically by determining frequency of standing wave generated within material.— H. N. Nerwin, Electronics, Jan 31, 1958.

TECHNICAL NOTES

More severe voltage dips, longer recovery times, and possible instability of some auxiliary drives are problems that must be met with time-delay bus transfer schemes as turbine-generator sizes increase.

Auxiliary power requirements for gas turbine plants are a fraction of what they are for steam power plants. Requirements vary from about 0.2 to 2.8% of output depending on type of gas turbine cycle and fuel used. Steam plant auxiliaries consume 5 to 7% of output.

Single-phase railroad loads can probably be served by direct transformation without extensive use of phase-balancing apparatus. This is one of the conclusions of a recent study of the potential load of the Norfolk and Western Railroad.

New process for electroplating copper on aluminum strip and aluminum wire shows promise for busbar conductors. Aluminum, coated this way, can be tinned 'soldered' or formed without breaking the copper plating.

The regenerative type gas turbine is justified for base load operation with high fuel costs. But with very cheap fuel the non-regenerative type turbine should be used.

FROM EDITORS IN THE FIELD

Reliability of boiler feed pumps in service has been established to such a degree that only two half-size pumps will be installed at the new Portland station of Metropolitan Edison Co. Elimination of the usual third pump will save an estimated $200,000.

THREE-PHASE INSTALLATION of L-M's new Ultra-Valve arresters, rated 60 kv maximum, in a 69 kv substation. The arresters are light and compact, and have outstanding electrical characteristics.

With Simple Series Gap and Valve Disc Design,

New Ultra-Valve Intermediate-Class Arrester Is Exceptionally Rugged, Durable, Light, Compact

Line Material engineers have developed a new, light, compact intermediate-class arrester that features rugged simplicity, exceptional durability and excellent protection.

These new Ultra-Valve arresters are easy to handle from receiving dock to job site, because they are decidedly lighter and more compact. Reduction in height has been achieved without a corresponding sacrifice in desirable external creepage distance, by providing a number of relatively deep skirts on the external housing surface.

The unusually rugged, simple construction minimizes the possibility of concealed damage caused by inadvertent rough handling in shipment or installation.

L-M's new Ultra-Valve arresters are capable of meeting the minimum discharge capacity and duty cycle tests for station-type arresters, as listed in ASA Standard C62.1-1957. These arresters provide excellent protective characteristics and are presently available in standard voltage ratings from 20 kv to 73 kv inclusive.

Ask your L-M Field Engineer for more information on how L-M's new Type F arrester can provide greater lightning and switching surge protection on your system. Or write Line Material Industries, Milwaukee 1, Wis. In Canada, Canadian Line Materials, Ltd., Toronto 13, Ontario.

Two-bolt terminals
Light-weight aluminum end-castings
Heavy compression spring
Ceramic resistor rings
Valve discs and spark gaps are alternated throughout the arrester

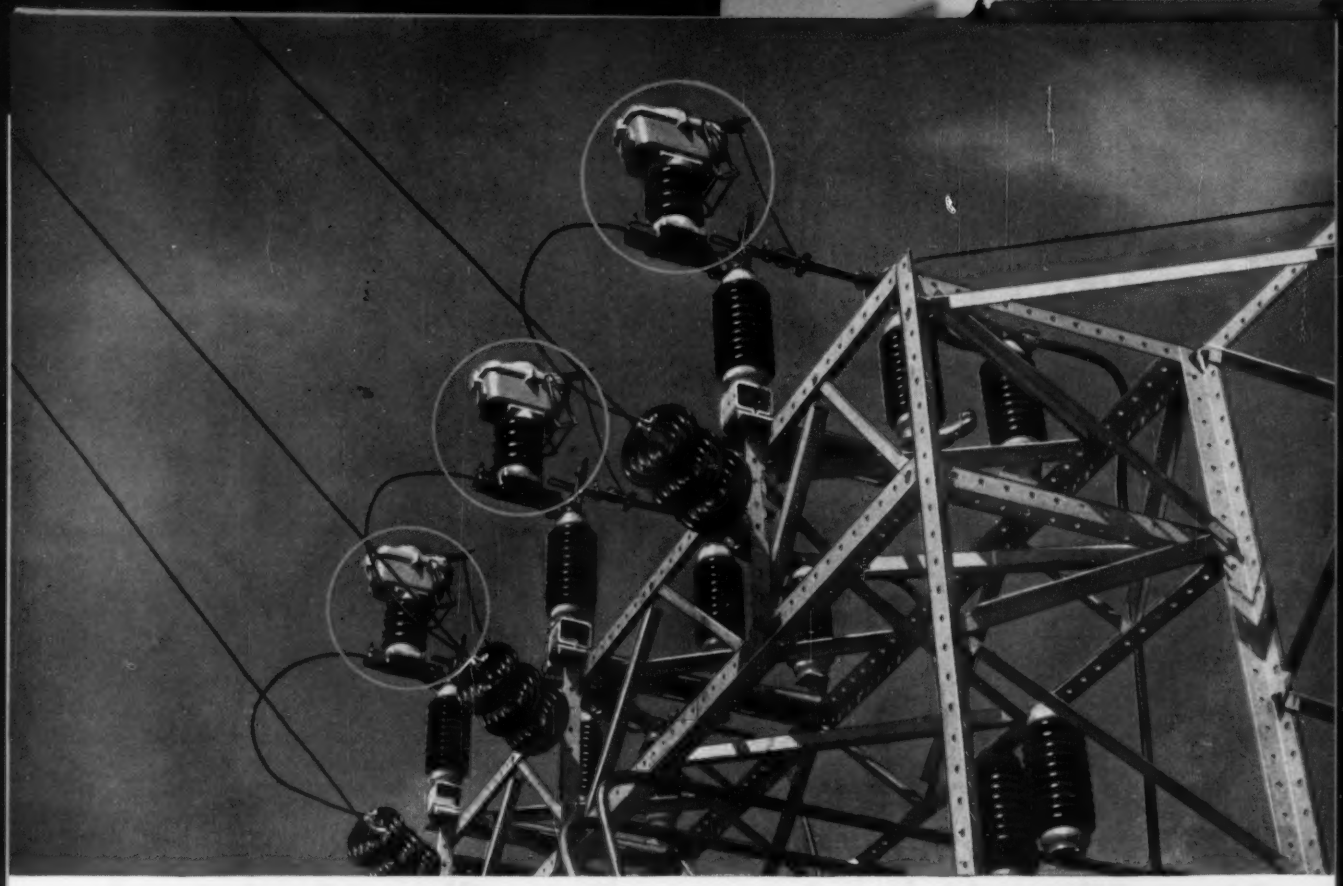
L-M's new Type F Ultra-Valve intermediate-class arrester is available in all standard ratings, 20 through 73 kv. 3 through 15 kv and 90 through 121 kv will be available soon.

LINE MATERIAL Industries

McGRAW-EDISON COMPANY

Lightning Arresters

McGRAW EDISON



THE NEW L-M OIL INTERRUPTER provides high-speed circuit interruption on sub-transmission circuits without external arc or flame. The unit costs less than half as much as other interrupters for the same application.

New High-Voltage Oil Interrupter For Only $290 Per Pole for 69 kv

Units cost less than half as much as other interrupters for the same application—$240 per pole for 23 kv and 34 kv, $265 per pole for 46 kv, and $290 per pole for 69 kv.

Now you can get an economical, high-voltage oil interrupter for sectionalizing and switching on sub-transmission circuits. The unit is capable of interrupting load currents, line charging currents, and transformer magnetizing currents. It easily meets NEMA and AIEE standards, including the ice test.

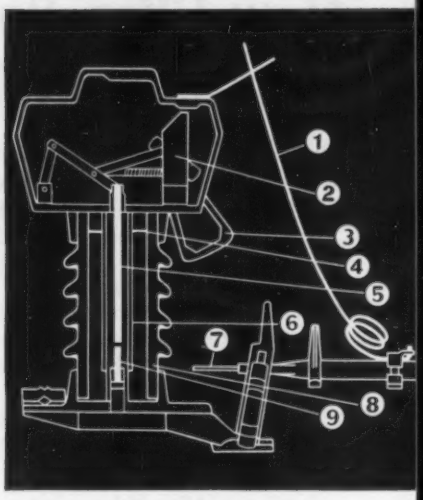
Contacts Separate At High Speed

The L-M interrupter consists of an oil-filled unit housed in a porcelain insulator, and a rod to shunt the current through the interrupter while the main switch blade is being disconnected. As the switch blade rises, it engages a spring trip lever which rises to over-toggle position, causing the contacts within the unit to separate under oil at high speed. The speed of the moving contact is independent of the operation of the main switch blade.

Contacts have long-life copper-tungsten arcing tips. All linkages are made of aluminum for lightness and fast operation. A simple fiber-washer arrangement provides a spiral passage for the pressure-generating arc, forcing oil and un-ionized gas around the arc core as the moving contact is withdrawn. This assures rapid arc extinction at low current values.

Ratings 23 kv Through 69 kv

L-M's new interrupter is available in 23, 34.5, 46 and 69 kv ratings. Continuous current rating is 600 amperes; momentary and short-time current ratings are 40,000 amps. for 10 cycles, and 25,000 amps. for 4 seconds. The unit can be installed on any of L-M's PV switches without altering the original parts. The addition of the interrupter does not change the electrical clearance or the phase spacing of the switch.



Cutaway View of Oil Interrupter

1. By-pass rod
2. Toggle mechanism
3. Trip lever
4. Oil level
5. Moving contact
6. Interrupter
7. Trip rod
8. Bushing
9. Stationary contact

Get Complete Information

Ask your L-M Field Engineer for more complete information on L-M's new high-voltage oil interrupter and on L-M's outstanding power switching equipment. Or write Line Material Industries, Milwaukee 1, Wis.

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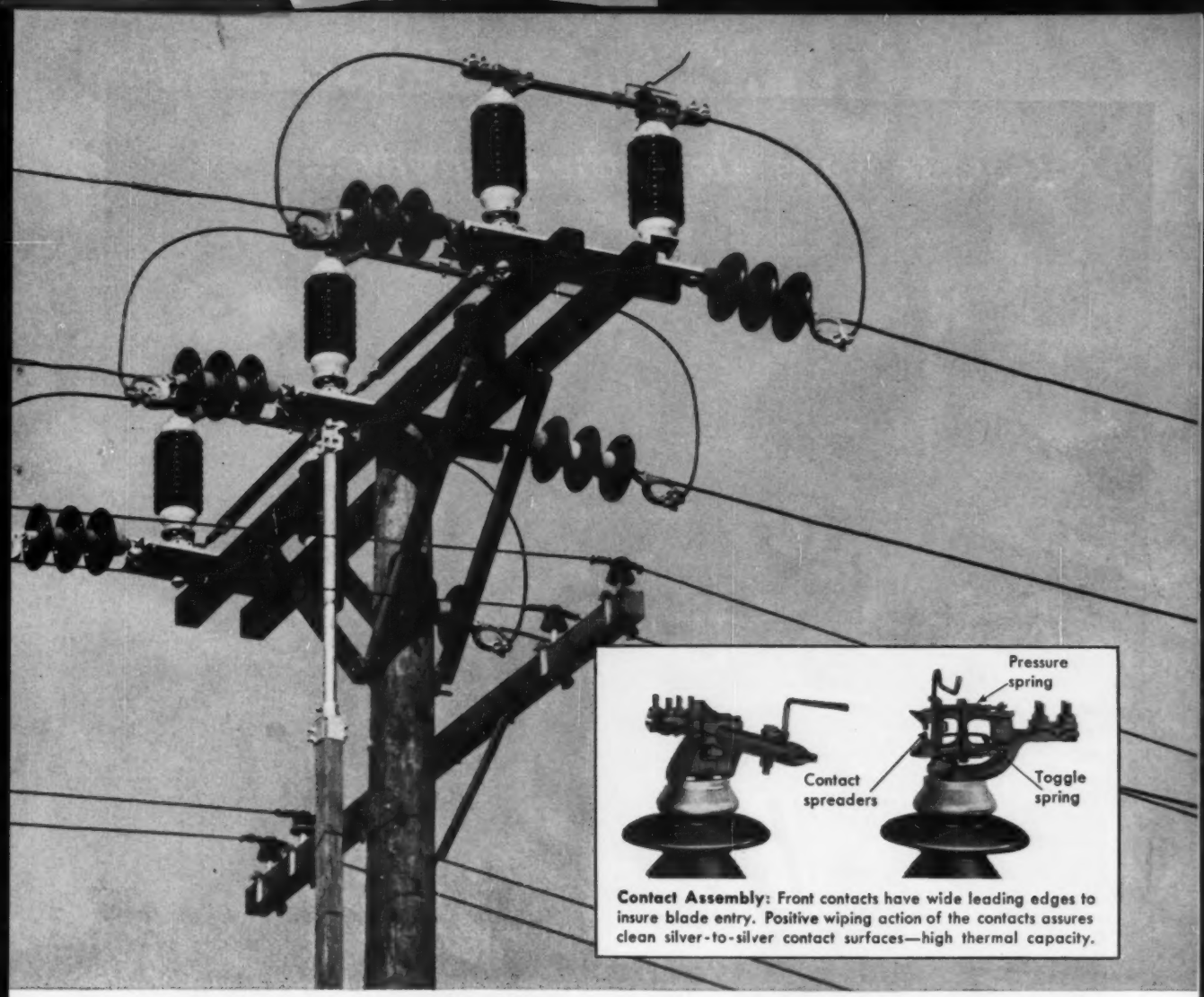
LINE MATERIAL Industries

A McGRAW-EDISON COMPANY

LM Power Switching Equipment

McGRAW EDISON



Contact Assembly: Front contacts have wide leading edges to insure blade entry. Positive wiping action of the contacts assures clean silver-to-silver contact surfaces—high thermal capacity.

L-M's New Side-Break Switch Is Rugged, Reliable and Easy To Operate

Line Material has designed a new, rugged side-break switch which has all the desirable operating features of a dependable switch for both line and substation sectionalizing.

Only six current transfer points with high-pressure silver-to-silver contacts and heavy back-up mass provide high thermal capacity for continuous or short-time fault currents. Straight-line current path minimizes short circuit forces tending to open switch. Minimum frictional drag at rotating terminal is achieved by current transfer on center of rotation. Rugged full-floating contacts swivel to give smooth, easy operation, positive wiping motion, and definite ice-breaking action.

Positive Toggle Action

Wide-angle leading edges on front contacts insure blade entry regardless of alignment, with no loss of contact pressure. Contact-positioning spring has positive toggle action to hold the contacts in the open position (45° from switch centerline) or firmly in the closed position. Ease of operation and long contact life result, because contact spreaders preload pressure springs for minimum contact movement during blade entry. Wide-spaced contact jaws and clearance around moving parts facilitate positive switch action under severe ice or corrosion conditions.

Silicone-Lubricated for Life

All bearings and moving joints on the switch are silicone-greased—lubricated for life, and positively sealed with silicone cord rings. Water, dust or dirt cannot enter to affect bearing operation.

Get Complete Information

L-M's new side-break switch is available in 600 amperes, 7.5 to 69 kv as a single-pole, or up to a six-pole unit. Ask your L-M Field Engineer for information and bulletins on L-M's Power Switching Equipment. Or write Line Material Industries, Milwaukee 1, Wisconsin.

McGRAW EDISON

LINE MATERIAL Industries

McGRAW-EDISON COMPANY

Power Switching Equipment

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Along today's modern highways easy-to-handle J-M Transite Ducts provide installation economies and years of service life, protecting traffic-signal, lighting, and other power-service circuits.

J-M Transite® Ducts install fast to last... give complete cable protection.

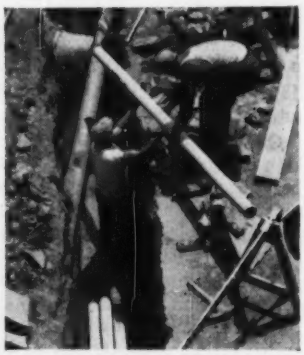
Because speed and economy set the pace in today's highway programs, more and more highway cables are going into Johns-Manville Transite Ducts.

For speed, Johns-Manville Transite Ducts are strong, light and long—easy to handle and install. Workmen set 10-foot lengths in place easily, join them up tight in seconds with snug-fitting J-M Plastic Couplings, and Transite's smooth bore is free of burrs and other obstructions that may interfere or cause damage during pulling of cables.

For economy, J-M asbestos-cement Transite Ducts go in to stay. Non-conductive Transite is not affected by electrolysis—resists the corrosive action of fills or high-salt soils in permanently damp locations. Millions of feet of installed Transite Ducts have proved that Transite withstands earth loads and soil stress . . . resists vibration and shock from highway traffic.

Let us send you free Transite Duct brochure EL-29A. Write Johns-Manville, Box 14, New York 16, N. Y. In Canada, Port Credit, Ontario.

JOHNS-MANVILLE PRODUCTS



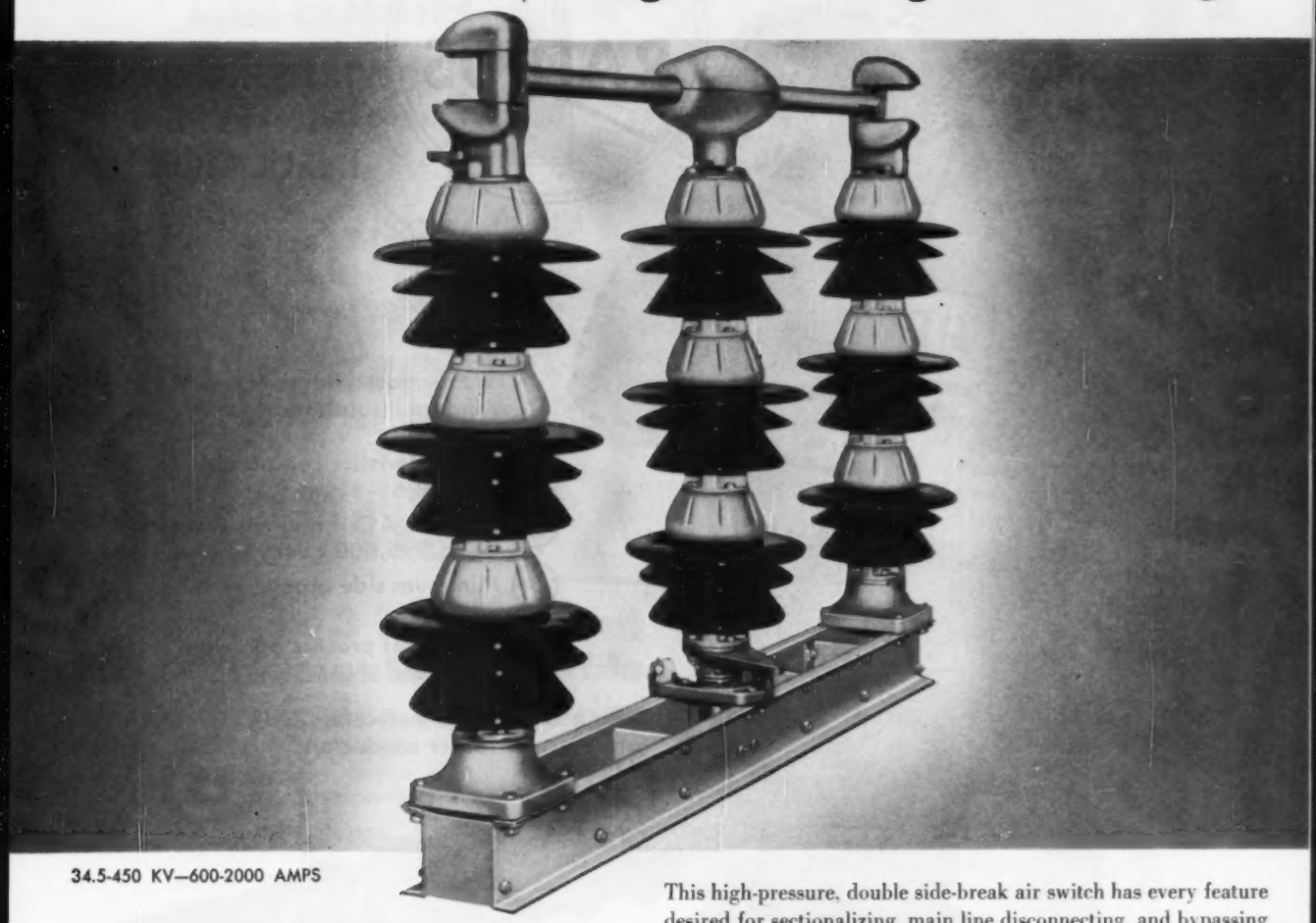
Johns-Manville Asbestos Transite Ducts can be laid directly in trench without concrete envelope or other mechanical protection.

JOHNS-MANVILLE Transite Ducts

Made of Asbestos-Cement

J-M Conduit for direct buried banks and exposed runs
J-M Korduct® for concrete banks

Southern States' streamlined RDC offers 5 big advantages in design



34.5-450 KV—600-2000 AMPS

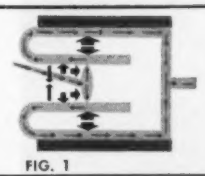


FIG. 1

CUTAWAY VIEW

Amplitact® Contacts on RDC

High pressure Amplitact contacts provide maximum dependability under high current short-circuit conditions. The arrows in Fig. 1 show direction and relative magnitude of electromagnetic forces induced when switch is subjected to fault current.

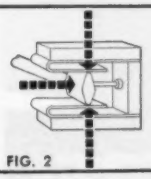


FIG. 2

The resultant ELECTROMAGNETIC forces, as shown by arrows in Fig. 2, greatly increase contact pressure and positively hold blade in engaged position.

This high-pressure, double side-break air switch has every feature desired for sectionalizing, main line disconnecting, and bypassing service in substations and on transmission lines. In addition the RDC has five outstanding advantages in its design:

1. Low silhouette in the open position permits application where vertical clearance prohibits the use of vertical-break switches.
2. Switch blade is completely dead in open position. Phase spacing is less than required for single side-break switches.
3. Horizontal breaking permits lower zone of protection against lightning, with corresponding savings in steel structures.
4. Smooth, corona-resistant contours result in RIV of less than 500 microvolts.
5. One-piece blade is balanced in all positions, reducing stress on moving parts. No blade balancing mechanism is required.

Your Southern States representative will be glad to give you complete details. Or write direct for Bulletin 57 RDC.

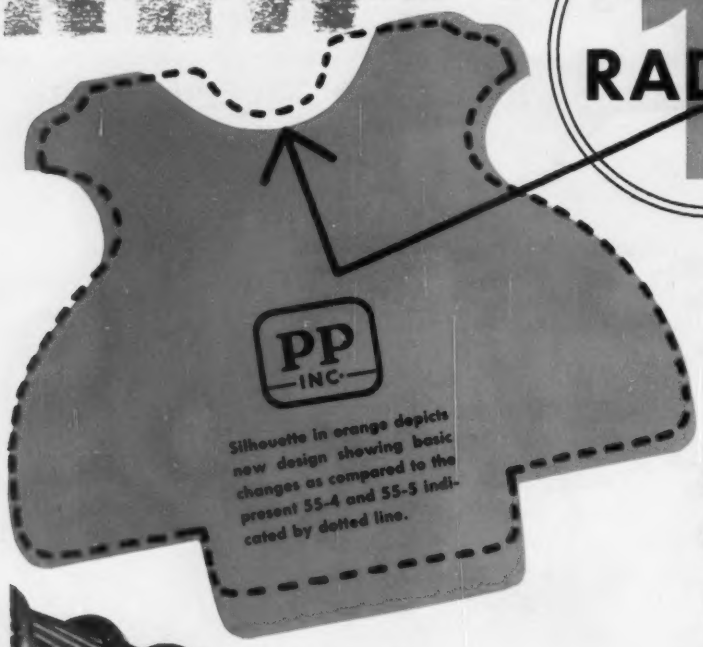
SOUTHERN STATES
EQUIPMENT CORP.
HAMPTON, GEORGIA

IN CANADA: Dominion Cutout Co., Ltd., Toronto

LIVE BETTER ELECTRICALLY

NEW 1" RADIUS WIRE GROOVE PIN-TYPE INSULATOR

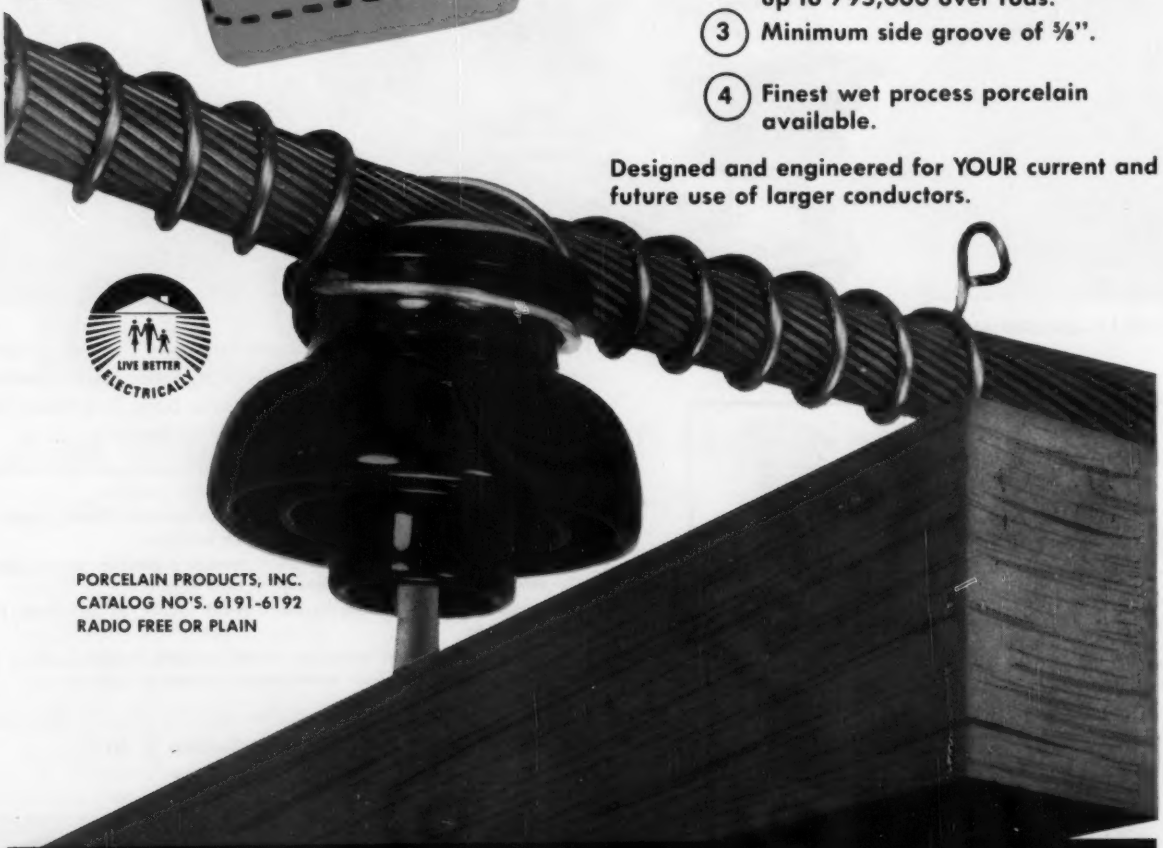
specifically engineered for **YOU**


PP
INC.
Silhouette in orange depicts new design showing basic changes as compared to the present 55-4 and 55-5 indicated by dotted line.

Two proposed future EEI-NEMA standard insulators.

1. **Characteristics comparable to the present 55-4 and 55-5.**
2. **Handles ACSR and All Aluminum up to 795,000 over rods.**
3. **Minimum side groove of ⅝".**
4. **Finest wet process porcelain available.**

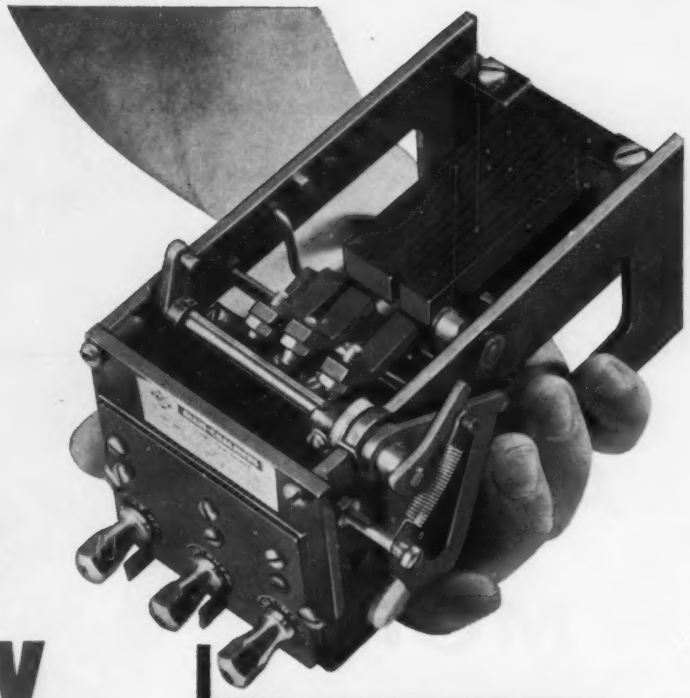
Designed and engineered for YOUR current and future use of larger conductors.



PORCELAIN PRODUCTS, INC.
CATALOG NO'S. 6191-6192
RADIO FREE OR PLAIN

Porcelain Products, Inc.
High Voltage Division — **Parkersburg, W. Va.**

ALLIS-CHALMERS
low voltage
switchgear



Here's

Proven Accuracy

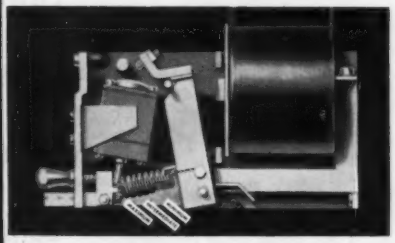
3 independent elements available in series trip device

This time-proven feature of Allis-Chalmers low voltage switchgear provides:

- **Accurate settings** — Adjusting knobs with calibration scales on front of trip device permit operator to adjust elements independently and set pickup for long time (80-160%), short time (500-1000%), and instantaneous (500-1500%).
- **Accurate action** — Silicone oil-filled, positive displacement time-delay device is completely calibrated and sealed under vacuum.
- **Accurate adjustment** — Minimum, maximum and intermediate time-delay band settings are field adjustable for each pickup value for fine selectivity.
- **Accurate indication** — Overcurrent trip flag to indicate phase which caused tripping of breaker is available.

Each trip element has its own armature and each armature acts directly on trip block. Accurate trip device is only one feature of Allis-Chalmers low voltage switchgear. For complete details, call an A-C office or write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wisconsin.

Operator inserting circuit breaker using positive-position pantograph. Note trip device accessibility, dead-front breaker, and drawout interlock.



Cutaway shows arrangement of components in Allis-Chalmers direct-acting series trip device. Note calibration scale below adjusting knobs and time band setting on armature extension.

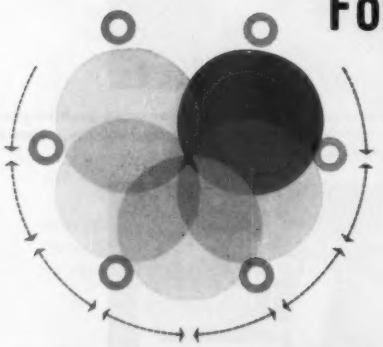
A-5553

ALLIS-CHALMERS

Pennsylvania

Introduces:

A NEW MORE RUGGED POLE STAR



Orange circles represent the five tap positions in which the movable, double-disc contact can be placed. A coil spring holds the discs firmly in place against adjacent stationary studs, represented by the smaller circles. The coil spring also results in snap-action movement from one position to the next when the tap changer operating handle is turned.

For: Greater Dielectric Strength

Higher Impact Strength

Lower Power Factor

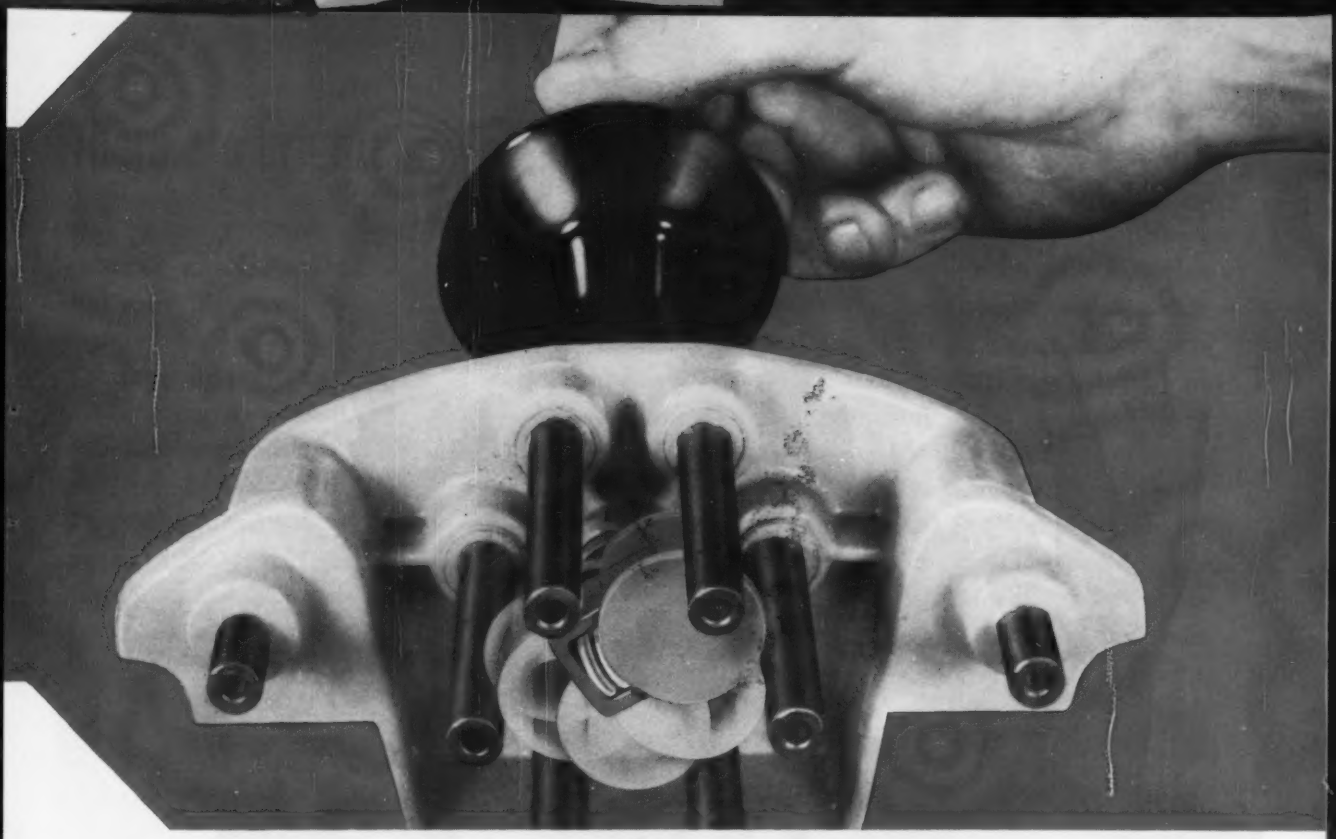
Excellent High Temperature Stability

More Accurate Dimensional Stability

Longer Creepage Distances

Elimination of Sludge-Gathering Projections

PENNSYLVANIA DISTRIBUTION



TAP CHANGER

The new tap changer is designed for all Pole Star distribution transformers through 167 kva, 18 kv class and below. Months of meticulous testing and research conclusively proved the superiority of glass-fibre-filled alkyd resin for this application. By providing far greater impact strength than the porcelain previously used for the tap changer body, alkyd resin imparts a new ruggedness to the Pole Star tap changer.

The new tap changer also has outstanding electrical characteristics—greater dielectric strength, lower power factor, longer creepage distances—as well as an ability to withstand extreme and sudden temperature changes. Elimination of sludge-gathering projections alone (there are no nuts and bolts on the top surface) can lengthen service life in cases where moisture enters the tank when taps are changed.

The new tap changer is one of the many Pole Star "plus" features. Contact Pennsylvania Transformer Division, McGraw-Edison Company, Box 330, Canonsburg, Pa.

Design and Construction Features of New Pole Star Tap Changer

1. New tap changer body is made of glass-fibre-filled alkyd resin, in which modern materials research has combined the most highly desirable electrical and mechanical characteristics.

2. Stationary copper studs are molded into tap changer body. Resulting absence of nuts and bolts on top surface provides greater creepage distances . . . eliminates sludge-gathering areas.

3. Floating brass roller with double-contact discs is loaded by coil spring that snaps roller into exact tap position when operating handle is turned.

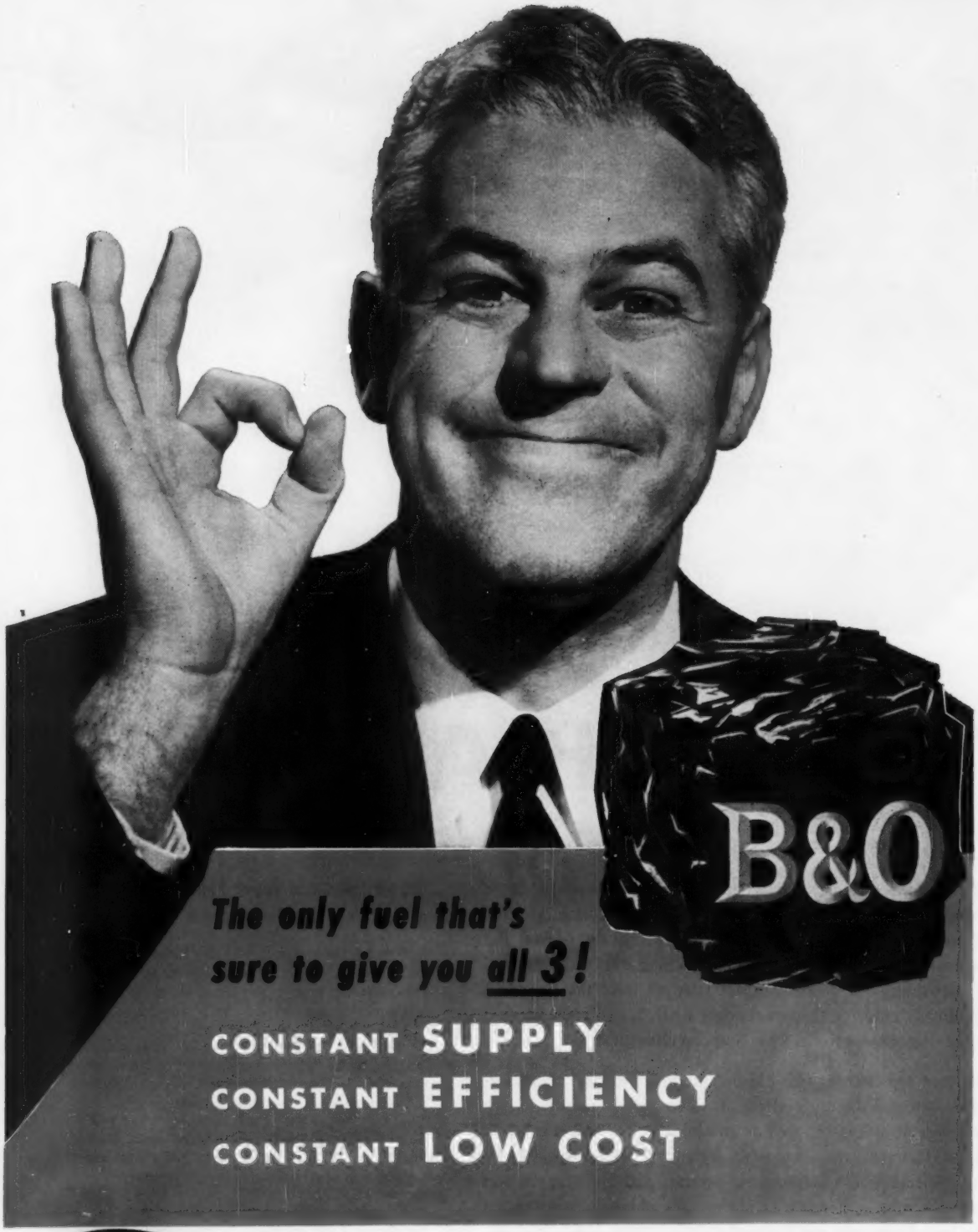
4. Crimping with pneumatic tools provides outstanding electrical and mechanical connection that neither age nor vibration will deteriorate.

5. Easy-to-read tap changer dial is located above oil level. Extra-large letters are white on solid black background.

TRANSFORMERS

PENNSYLVANIA TRANSFORMERS POLE STAR

McGRAW EDISON



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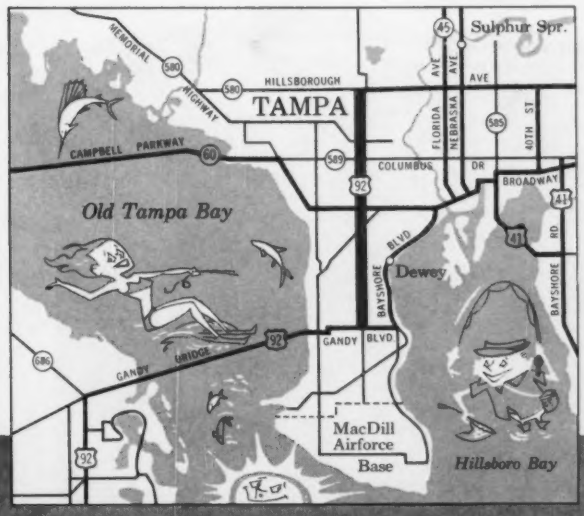
Ask our Man! BALTIMORE & OHIO RAILROAD, BALTIMORE 1, MD. *Phone* LExington 9-0400

There are brighter nights ahead...and HAPCO points the way

Day by day, the rapid growth in our network of freeways, express roads, parkways and toll roads becomes more apparent. Each business trip, every vacation tour exposes wider, straighter, smoother and safer highways. At night, thanks to modern lighting methods, these "super" expressways maintain high levels of visual safety. Slim, trim Brackets and Poles by Hubbard Aluminum Products Company support the luminaires in an ever increasing number of these modern installations.

For example, a recent Florida installation by Tampa Electric Company lights up a busy seven mile stretch of four-lane Dale Mabry Highway. From the northern City Limits to Gandy Boulevard, traffic moves easily and safely, day and night, over this heavily travelled section of U. S. Route 92. The job required 259 mercury vapor luminaires, all supported by HAPCO Brackets. In the complete HAPCO line of Standards and Brackets are designs for all types of modern, low-maintenance outdoor lighting installations. For more information, write to Hubbard Aluminum Products Company, 6301 Butler Street, Pittsburgh 1, Pa.



HUBBARD ALUMINUM PRODUCTS COMPANY

Division of Hubbard & Company
Pittsburgh 1, Pennsylvania

Tampa, Florida—Seven miles of brilliant mercury vapor lighting shows the way along Dale Mabry, one of Tampa's main traffic arteries. The 259 luminaires are mounted on 208 HAPCO 8-foot Brackets and 51 HAPCO 6-foot Brackets.

New!

Six week delivery
Pancake type radiators
Components of your choice

LO-TEMP*
VAULT TYPE NETWORK TRANSFORMERS

This Standard Transformer Lo-Temp unit is three phase, 750 KVA, 14,400 volts primary and 480Y/277 volts secondary. It is a special, designed to go through a minimum sized opening. This unit costs no more than an off-the-shelf transformer, yet it was designed to the customer's specs, beats all requirements for sound level and temperature rise and it was delivered in just six weeks.

It doesn't cost a penny more to have your transformers designed by Standard to your specs. Check with your nearby representative or write to us. You'll get better transformers with longer life delivered in less time. Sound impossible? Prove it to your own satisfaction by getting the facts today. Ask your nearby Standard representative or write directly to us.

*LO-TEMP TRANSFORMERS PROVIDE EXTRA CAPACITY AT NO EXTRA COST.

LIVE BETTER ELECTRICALLY

Phone Warren 2-1563

Standard Transformer CO.

WARREN, OHIO

"WHEREVER THERE IS POWER"

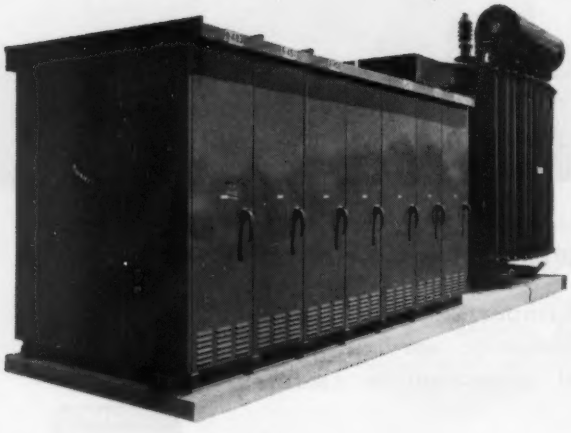
TIME IS THE MEASURE OF ALL WOOD PRESERVATION

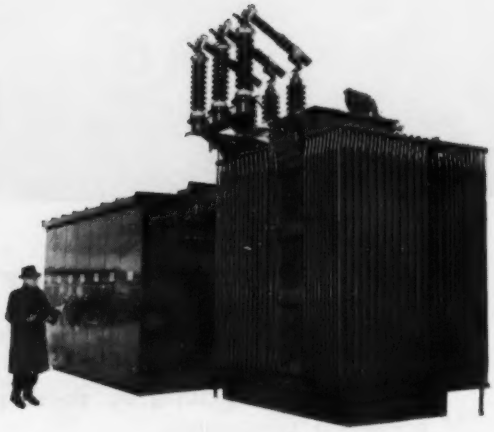
Working or relaxing, you recognize the importance of protecting your investment in wood. . . . For industry, service records show that the longest, most practical protection is AMCRECO pressure treatment.

AMCRECO
PRESSURE TREATED WOOD PRODUCTS

AMERICAN CREOSOTING CORPORATION LOUISVILLE 8, KENTUCKY
SUBSIDIARY OF UNION BAG-CAMP PAPER CORPORATION

PRIMARY UNIT SUBSTATIONS



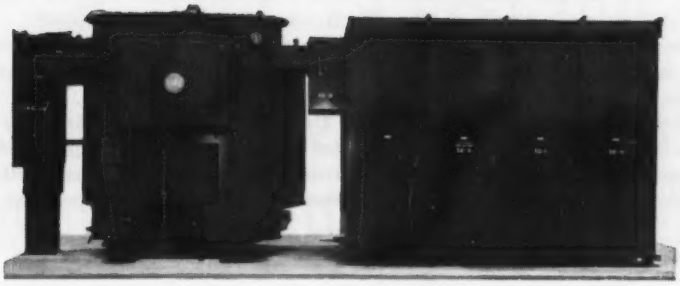


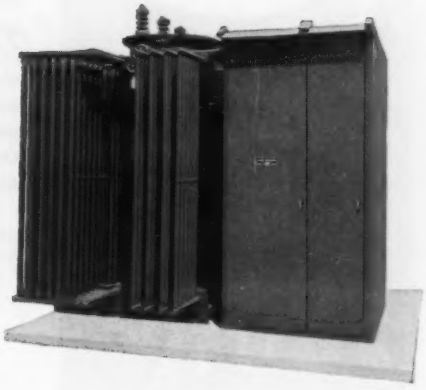
Winning Value Recognition All Over the Map

Look around you today. You will see more I-T-E PRIMARY UNIT SUBSTATIONS going into service everywhere—in places where orders are placed after careful evaluation of several different makes. The growing trend toward I-T-E substations reflects the response of shrewd buyers to I-T-E's standing policy of giving more value for no more money. I-T-E engineers work with you in the planning stage . . . custom design the station to meet your particular requirements . . . skillfully arrange I-T-E's quality components into an efficient unit that gives you the maximum value for the minimum investment . . . make deliveries to meet your construction schedules. Make I-T-E your dependable, single source for complete PRIMARY UNIT SUBSTATIONS.

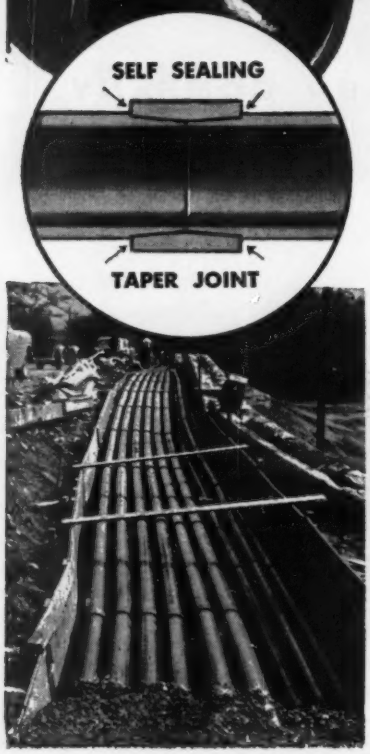
For information, write I-T-E Circuit Breaker Company, Switchgear Division, 19th & Hamilton Sts., Philadelphia 30, Pa. In Canada, Eastern Power Devices Ltd., Port Credit, Ontario.

I-T-E CIRCUIT BREAKER COMPANY
PHILADELPHIA, PENNSYLVANIA





SMOOTH BORE!



Orangeburg Fibre Conduit Prolongs Cable Life

Protect cable sheath from abrasion and you prolong the life of underground cables, say utility engineers. Scoring of cable sheath creates "trouble spots" that shorten cable life.

That's where Orangeburg Fibre Conduit plays an important part in keeping cables healthy. Orangeburg's smooth bore, its low coefficient of friction minimize the danger of abrasion when cables are pulled in, as well as later on during cable movement. By protecting cable sheath from abrasion, Orangeburg Fibre Conduit adds years to cable life.

Orangeburg's impermeable wall and watertight joints protect cables from corrosive ground waters. Its nonmetallic material is strong, tough, resilient, long lasting.

And, remember, Orangeburg lays faster and at lower cost than other types of conduit. It is light in weight, easy to handle, easy to tool on the job. Spacers, bends, fittings, 5° bend sections and lightweight tapering tool, all combine to simplify installation.

Since 1893, records of long life have proved Orangeburg's durability and economy.

Orangeburg Fibre Conduit is distributed by Graybar Electric Company and General Electric Supply Company with branches and stocks in principal cities.

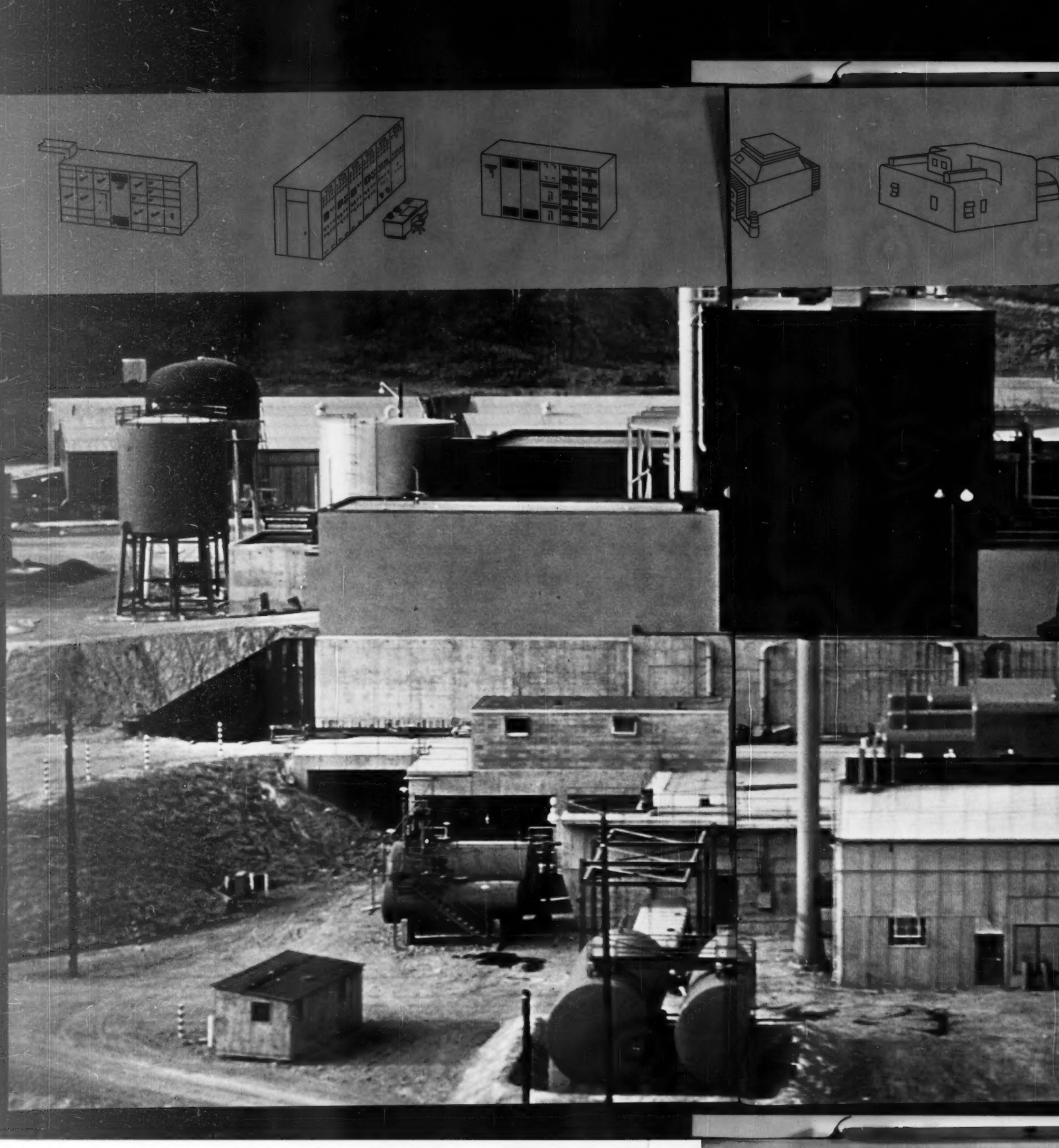
WRITE DEPT. EW-28 FOR NEW CATALOG 52.

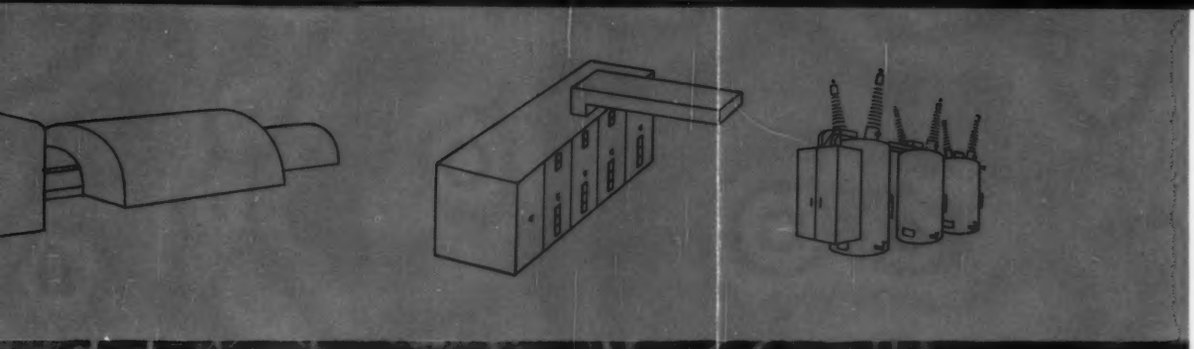
ORANGEBURG MANUFACTURING CO., INC., Orangeburg, N. Y. West Coast Plant, Newark, Calif.

ORANGEBURG®
FIBRE CONDUIT

SHIPPINGPORT, U.S.A.

World's first full-scale
atomic power station
devoted exclusively to peacetime needs





Westinghouse atomic reactor pours power into Pittsburgh area–industry, commerce, homes

One of the most important pieces of machinery in the history of American industry officially went on the line December 18, 1957, when the world's first full-scale atomic power reactor devoted exclusively to peacetime needs started to produce power at Shippingport, Pa.

Out of that generating station is coming the first large-scale production of electricity from the atom . . . but out of it also will come the answers to questions which are of the utmost importance to the electric utility industry.

For the answers to these and dozens of other questions, scientists, engineers, businessmen, utility executives and Government officials have been and will be intently watching the Shippingport reactor.

The development of the full potential of atomic energy as a source of electricity has been . . . and still is . . . a job of gigantic proportions, and that gives this pioneer plant an importance far beyond any foreseeable advances in the conventional power plant.

Westinghouse is proud to have played such an important part with the U. S. Atomic Energy Commission and Duquesne Light Company in this historic development.

The Shippingport plant is a joint venture of the Atomic Energy Commission and Duquesne Light Company. Westinghouse, under contract to the A.E.C., designed and developed the nuclear reactor. Duquesne Light built the electric generating portion of the plant and is operating the entire plant.

YOU CAN BE SURE...IF IT'S Westinghouse

CONGRATULATIONS TO DUQUESNE LIGHT COMPANY, PITTSBURGH, PA., on the starting of the world's first full-scale nuclear power generating station devoted exclusively to peacetime needs

At Shippingport, Pennsylvania, this joint project of the U. S. Atomic Energy Commission and the Duquesne Light Company is the world's first full-scale atomic power station devoted to nuclear power exclusively for civilian needs. Shippingport will be operated by the Duquesne Light Company.

Westinghouse designs, develops, coordinates, builds nuclear reactor and associated equipment

The Shippingport plant is the result of research, hard work and cooperation. Westinghouse designed and developed the nuclear reactor under contract to the Atomic Energy Commission, while Duquesne Light built the electric generating portion of the plant and is operating the entire plant.

FROM WESTINGHOUSE RESEARCH, ENGINEERING AND MANUFACTURING RESOURCES COMES EQUIPMENT FOR THE ATOMIC ELECTRIC POWER PLANT

In addition to the nuclear portion of Shippingport, Westinghouse supplied . . .

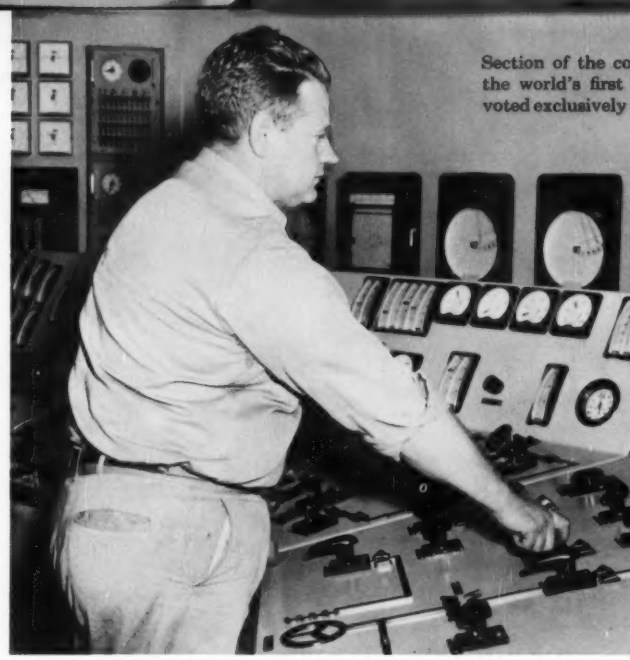
Turbine Generator
Power Breakers
Control Centers
Instruments
Condenser and Condensate Pumps
Metal-Clad Switchgear
Dry-Type Transformers
Protective Relays

from plowback of earnings into research and development

Westinghouse, leader in research and development of power apparatus for over 70 years, can provide you with a two-pronged advantage in the nuclear power field—Westinghouse research, engineering and manufacturing facilities for a complete line of power plant apparatus—and the longest record in successful atomic power development.

Westinghouse entered the nuclear field over 18 years ago with the first industrial atom smasher. To maintain this leadership, Westinghouse is currently building the first privately owned materials testing reactor. This is another step in the continuing program of development and testing of nuclear control and power generating apparatus. Today's most complete facilities are backed by years of laboratory and practical experience unexcelled in the industry.

YOU CAN BE SURE...IF IT'S Westinghouse



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the world's first
voted exclusively

THESE CONTROLS CHANN NATURE'S BASIC FORCE INTO 60,000 kw OF COMM

Over-all coordinated operations center pro complete nuclear plant control and instru first full-scale atomic power plant

At Shippingport, Pennsylvania, one control room provides for the operation and control of the nuclear reactor, its associated equipment and the turbine generator. The electrical systems required for the control and instrumentation of the plant are designed into functional groupings in this key center.

The
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panels b

BUY EXPERIENCE . . . BUY WESTINGHO

Under contracts from a number of the world's leading electric utilities, Westinghouse is continuing the development of the full potential of atomic energy as a source of electric power. Outstanding among the domestic projects are:

Yankee Atomic Electric Company

A 134-mw plant being built near Rowe, Massachusetts, by 11 of New England's leading utilities. Scheduled to go on-line in 1960, this plant features a pressurized water reactor with stainless-steel-clad fuel elements. In addition to the nuclear steam generator, Westinghouse is supplying other major components for the plant.

Penns

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YOU CAN BE SURE...

of the control and instrumentation center of
d's first full-scale atomic power station, de-
clusively to peacetime needs, Shippingport, Pa.

ANNEL
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OMMERCIAL POWER

r provides
nstrumentation for the world's

The control and instrumentation devices are grouped in panels with their corresponding switches, meters, instruments and other operators' controls on the console panels. All functions are monitored at their respective console panels by the operators.

NGHOUSE

Pennsylvania Power and Light Company

A partner with Westinghouse in the design study of a large aqueous homogeneous reactor. This type of reactor anticipates a low fuel cost.

Westinghouse has pioneered many important generating station developments and pioneered, too, atomic power development. Westinghouse is equipped by experience in design and manufacture to consult with you and to provide the best in power stations, nuclear or conventional.

CP-1049

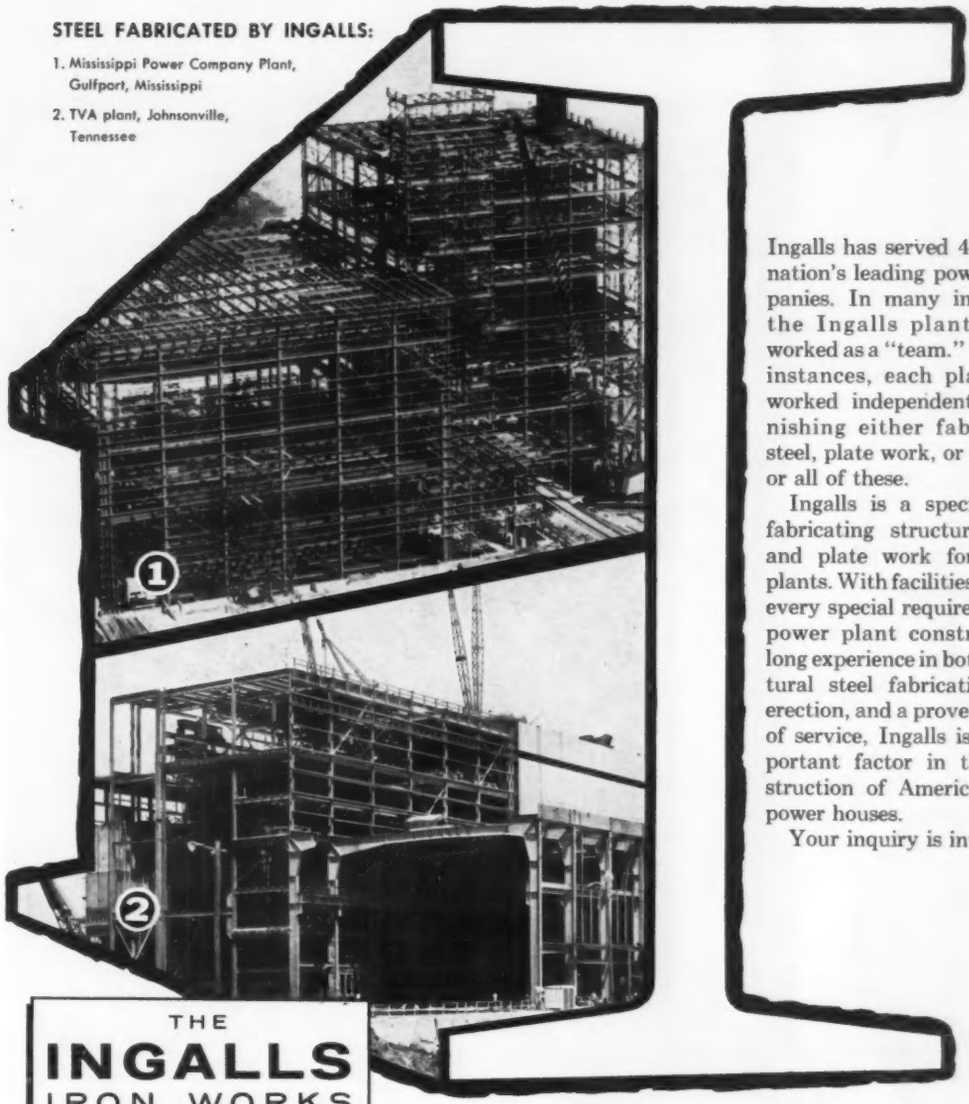
SURE...IF IT'S Westinghouse

INGALLS:

Fabricating Structural Steel for America's New Power Houses

STEEL FABRICATED BY INGALLS:

1. Mississippi Power Company Plant, Gulfport, Mississippi
2. TVA plant, Johnsonville, Tennessee



Ingalls has served 46 of the nation's leading power companies. In many instances, the Ingalls plants have worked as a "team." In other instances, each plant has worked independently, furnishing either fabricated steel, plate work, or erection or all of these.

Ingalls is a specialist in fabricating structural steel and plate work for power plants. With facilities to meet every special requirement of power plant construction, long experience in both structural steel fabrication and erection, and a proven record of service, Ingalls is an important factor in the construction of America's new power houses.

Your inquiry is invited.

THE
INGALLS
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STEEL PLATE FABRICATORS ASSOCIATION FOUNDED 1933

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ABOUT
LJUNGSTROM®
research and engineering
Air Preheater has made many important advances in gas-to-gas heat exchangers over the past 32 years. Some of the major developments of Air Preheater research are:
• The mass flow soot blower
• Multiple-layer heating surface
• Wide-spaced cold end heating surface
• Methods of cold end protection
• Use of alloy steel for cold end material
• Designs of more compact and effective heating surfaces
• Heat transfer surfaces replaceable during boiler operation
• Superheated steam for soot blowing
That's why seven out of ten air preheater installations are Ljungstrom. For the full story of its many advantages, write now for your copy of our 32-page manual.
The Air Preheater Corporation 60 East 42nd Street, New York 17, N. Y.

T-lug accommodates one size larger tap than line wire—widely separated from line to minimize galvanic corrosion.

Only 3-11/16 inches high. Streamlined and compact. Adaptable for use on small stirrups.

Screw chamber lubricated for full thread protection.

Internal jaw stop engages in body channel to limit travel, prevents jaw and body from separating.

NEW KEARNEY

3532-series protected-thread HOT LINE CLAMP

assures positive current transfer...

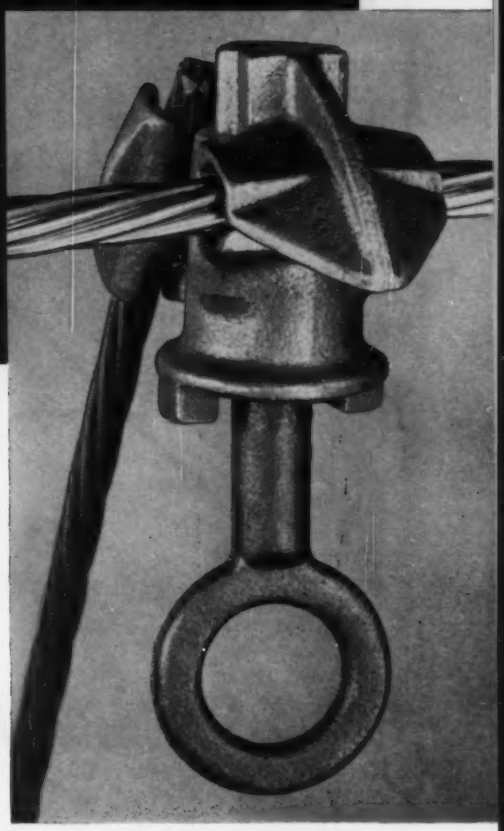
Accommodates all-conductor combinations—copper-to-copper, copper-to-aluminum, aluminum-to-copper, and aluminum-to-aluminum.

Kearney's newly-designed 3532-series hot line clamps are available as follows:

Line Side Range

ALL BRONZE BODIES.....#6 Sol. Cu.—#2 Str. Cu.
ALL ALUMINUM BODIES.....#6 Sol. Al. —#2 ACSR
FULLY PLATED BRONZE BODIES..#6 Sol. —#2 ACSR

Tap Side Range.....#6 Sol. —1/0 ACSR



Wide, deep-seated contacts match line conductor contours, long-line contact surface assures positive current transfer between each outside strand and clamp.

JAMES R. KEARNEY CORPORATION • 4224-42 Clayton Avenue • St. Louis 10, Mo.

392

FOR BETTER CONSTRUCTION—SAFER MAINTENANCE

Specify Kearney Products

Plants at: ST. LOUIS • FAYETTEVILLE, ARK. • SHENANDOAH & CLARINDA, IA. • GUELPH, ONT., CAN.

you can count on quality performance

Ebasco offers many consulting services to industry. In each you'll find the same stamp of quality that distinguishes the plants Ebasco designs and builds.

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For more information, write for our booklet, "Appraisal Services". Address: Ebasco Services Incorporated, Dept. M, Two Rector Street, New York 6, New York.

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NEW! "Feather-touch" PUSH-to-TEST PILOT LIGHT

Added to Square D Oil-Tight Pushbutton Line

- Completely oil-tight, even when depressed
- Pressure connections eliminate internal wires
- Positive contact "feel" in test position
- No additional panel space required
- Choice of 6 color caps
- Full range of voltage ratings
- Mounts interchangeably with oil-tight pushbuttons and selector switches

OIL-TIGHT OPERATORS

Standard Button

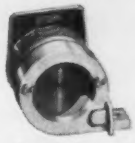
Mushroom Button

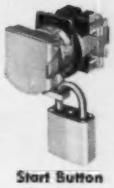
Selector Switch

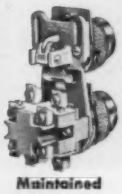
Coin-Operated Selector Switch

Key-Operated Selector Switch

Selector Pushbutton


Stop Button Lockout

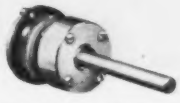

Start Button Lockout


Maintained Contact Attachment

Selector Switch and Pushbutton Lockout

NEW!

4-Position Joystick Operator


Wobble Stick Operator

Neoprene Cap

Here's why Square D Pushbuttons are preferred —by those who *build* machines—and by those who *buy* them!

Easy to use • Operators require only a single mounting hole for quicker installation. Pressure wire connectors mean simplified wiring.

Longer lasting • All-metal operator construction, anodized aluminum buttons, mean greater mechanical life. Melamine contact blocks with double-break silver contacts assure longer electrical life.

Wide flexibility • Any operator can be used with any contact block to meet all your requirements.

Small size • Only a minimum of panel and back-of-panel space is required.

Variety of contacts • Contact block arrangements include single-pole double-circuit, duplex double-circuit, tandem duplex, three-position duplex, and overlapping contacts.

• • •

***FOR COMPLETE INFORMATION** on oil-tight pushbuttons, send for Bulletin 9001-T to Square D Company, 4041 North Richards Street, Milwaukee 12, Wisconsin.*

EC&M HEAVY INDUSTRY ELECTRICAL EQUIPMENT...NOW A PART OF THE SQUARE D LINE

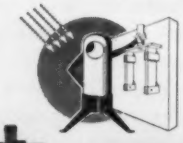
SQUARE D COMPANY

DEPENDABLE OUTDOOR LIGHTING CONTROL

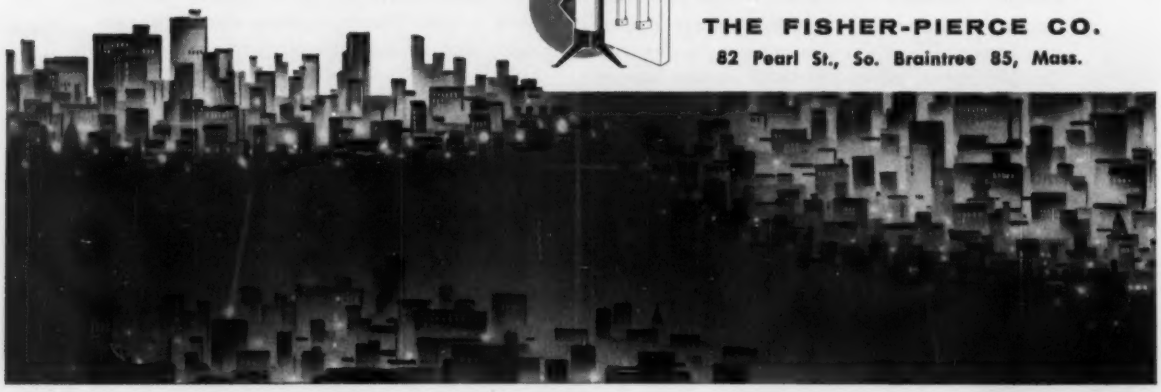
.....*from coast to coast*

Throughout the United States, Fisher-Pierce units have provided more hours of dependable street light control than any other make of photoelectric control. For more than twelve years Fisher-Pierce has set the pace in the development and manufacture of photoelectric controls for all types of outdoor lighting.

Today Fisher-Pierce, backed by an organization of 600 people, offers unlimited facilities for the development of new controls and allied products for the electric utility industry . . . as well as the extensive service organization that stands behind each F-P control. Whether your requirements call for proven lighting controls for any type of outdoor lighting, development of new electric or electronic products, or engineering service in the installation and maintenance of lighting control systems . . . call on Fisher-Pierce.



THE FISHER-PIERCE CO.
82 Pearl St., So. Braintree 85, Mass.



Sangamo J2 Meters

CLASS 100 AND CLASS 200

Give you all the revenue you've got coming

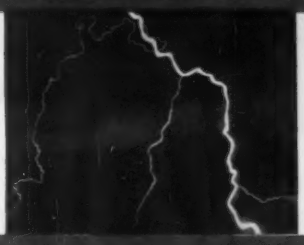
Sangamo watthour meters start on a 9 watt load and measure accurately to full 100 or 200 amperes. Will fully record the lightest loads of today and the heaviest loads of the future.

Give you all-weather accuracy

Corrosion-resistant finishes and materials are used throughout J2 Meters. You get optimum performance in humid, salt-laden or corrosive industrial atmospheres.

Give you protection against surge voltages

The extremely high insulation level of J2 Meters withstands high-voltage surges without damage. Highly surge-resistant Alnico damping magnets resist the de-magnetizing effects of lightning.



Give you sustained accuracy at all loads

Sangamo J2 Meters have the highest starting torque in the industry. Their accuracy is not affected by friction caused by foreign matter—even down to the lightest loads.

Give you slowest disk speed

Only 10 revolutions per minute at full nameplate rating means longer meter life—and pleases meter-watching customers, too!

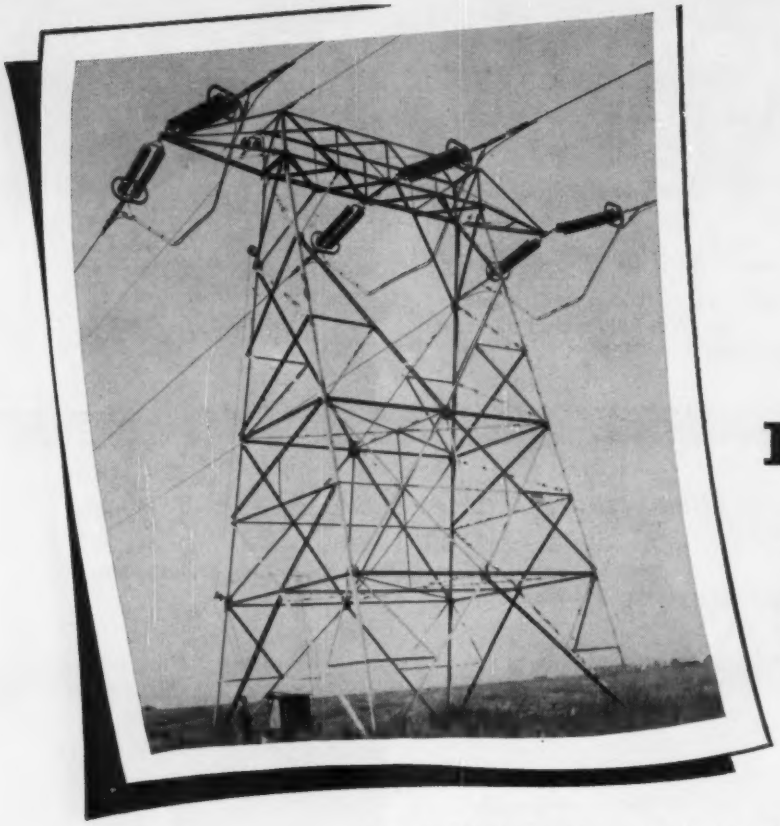
...AND ARE GUARANTEED FOR LIFE!

Now, an unprecedented lifetime guarantee—covering materials, workmanship and *bearing systems*—is offered on all Sangamo J2 Meters.

JM58-1

SANGAMO ELECTRIC COMPANY

SPRINGFIELD, ILLINOIS



In 1923 this was EHV

Lapp "high strength" suspension insulators were used by Southern California Edison Co. for its 220 kv Eagle Bell line. Erected in 1923, this line is now in its 35th year of service. Original insulators are still in place. Company reports "no trouble"; total replacement of insulators for all causes over 34 years is "less than 1%."

"Design for electrical security and long life—then do all you can to make it strong." This has been a Lapp principle from the beginning. In 1923, when the line shown above was erected, the insulators on it were cataloged as 18,000-lb. units—at a time when the industry was talking generally of 9,000-lb. and 12,000-lb. units. Before, and since then, Lapp has pioneered in insulators that combine long life with high mechanical strength.

For your EHV and other high-mechanical-loading requirements, specify the current Lapp 25,000-lb. suspension units; another generation of operating people in your company will be proud of the service records they set.

Lapp Insulator Co., Inc., Le Roy, N. Y.

They packed up turbine oil worries at Alton Box Board

six turbines use NONPAREIL Turbine Oil, have life-of-turbine guarantee

Six NONPAREIL Turbine Oil guarantee certificates on the turbine room wall are pointed out by M. D. Jones, Superintendent of the Power and Steam Department. Standard Oil Company's lubrication engineer, W. P. "Sandy" Wehking, helped put most of the certificates there.

Alton Box Board Company, Alton, Illinois, doesn't have a worry in the world about turbine oil. The Company has six turbines in service—four in the power plant and two in the paper mill—all using NONPAREIL Turbine Oil. Why no worries? Because each of these fills of turbine oil is *guaranteed for the life of the turbine* not to exceed a neutralization number above 0.15 mg. KOH/g.

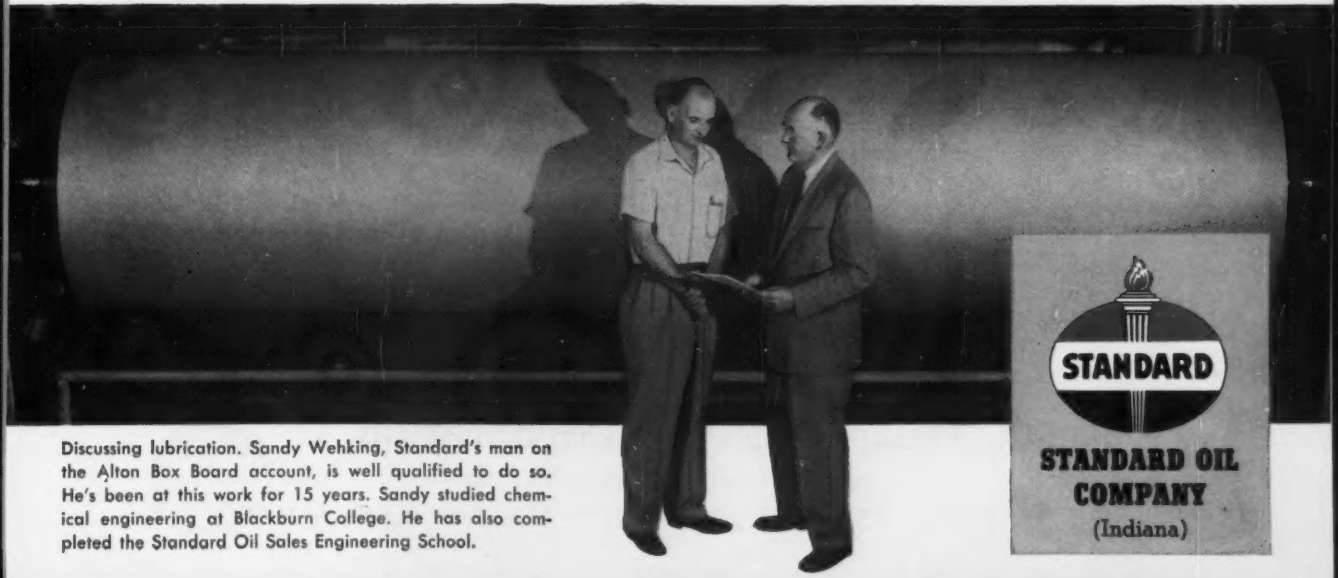
The five Westinghouse and one G-E turbine oil fills have demonstrated a remarkable low acidity record over the years. Regular inspection by Standard Oil technical service representatives and analysis of oil samples by the Standard Oil Research Laboratory, Whiting, Indiana, makes sure the oil is performing in accordance with the guarantee. At Alton Box, neutralization number of the oil has been running 0.02 to 0.03 mg. KOH/g.

This is what such service from a turbine oil means to Alton Box Board: They can run one of the largest board mills in the world without having to concern themselves with the performance of the turbine oil they are using. Standard Oil technical service men inspect the system. The oil is sampled and analyzed regularly. Plant operation will never be interrupted because of turbine oil lubrication failure.

The same performance from NONPAREIL Turbine Oil and service from Standard Oil awaits you. Find out. Call your nearby Standard Oil office near you in any of the 15 Midwest and Rocky Mountain states. Or write Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.

How NONPAREIL Turbine Oil is performing at Alton Box Board

Make of Turbine	kw. (H.P.)	Year NONPAREIL Installed	Location	Gal. fill.	Neut. No. mg. KOH/g.
Westinghouse	1,500	1934	Power Plant	85	.02
Westinghouse	3,125	1936	Power Plant	275	.03
General Elec.	400	1936	Paper Mill	50	.02
Westinghouse	1,500	1941	Power Plant	250	.03
Westinghouse	5,000	1947	Power Plant	230	.03
Westinghouse	1,500	1947	Paper Mill	80	.02



Discussing lubrication. Sandy Wehking, Standard's man on the Alton Box Board account, is well qualified to do so. He's been at this work for 15 years. Sandy studied chemical engineering at Blackburn College. He has also completed the Standard Oil Sales Engineering School.

STANDARD

STANDARD OIL COMPANY
(Indiana)

Rotary kilns at Missouri Portland Cement Company.

Missouri Portland Cement meets increasing power needs... provides for future expansion!

In 1949, Missouri Portland Cement Company completed a modern power distribution system to meet its demands for electricity at its Prospect Hill plant. Its main substation provided 12,000 kva of transformer capacity — supplied by two Wagner Power Transformers — which could be raised to 16,000 kva by the use of cooling fans. The system also included five 750 kva load-center unit substations — powered by Wagner Unit Substation Transformers.

Since that time, a need for increased production brought about the installation of a third rotary kiln, and even 16,000 kva was inadequate. This pressing need for more power was met by the addition of a third 6000/8000 kva Wagner Power Transformer, and by the addition of another Wagner Unit Substation Transformer for the load-centers.

Wagner Power and Unit Substation Transformers can meet your power needs just as they do at Missouri Portland Cement Company. Ask your nearby Wagner Sales Engineer to help you plan for your power needs. Call the nearest of our 32 branch offices, or write us.

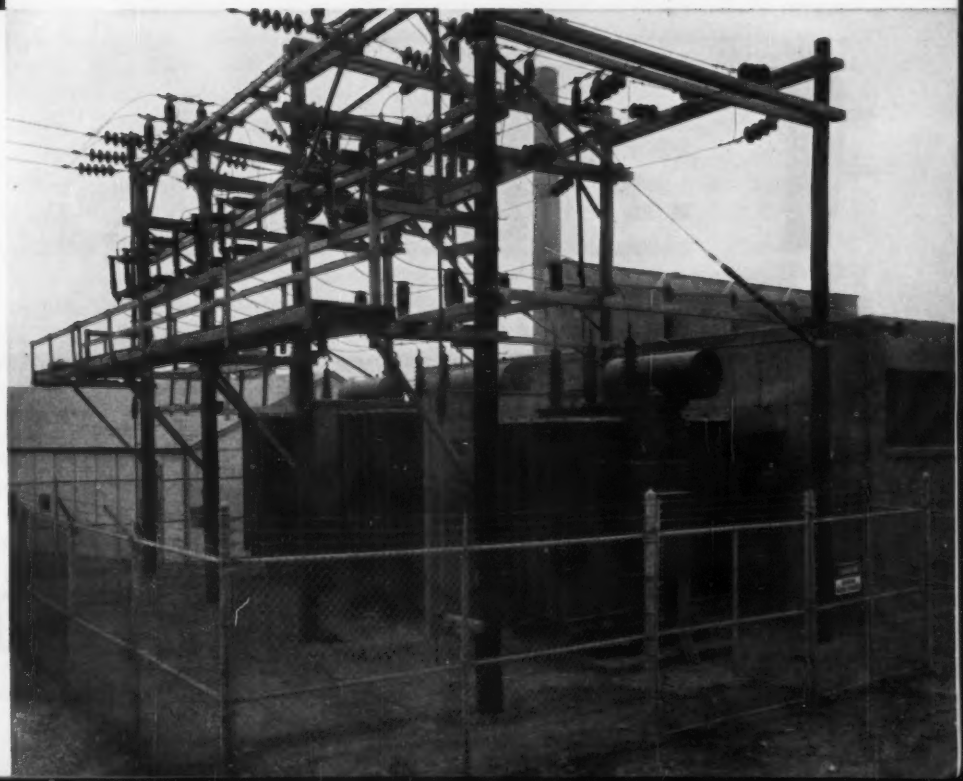
Wagner Electric Corporation

6456 PLYMOUTH AVE., ST. LOUIS 14, MO.

BRANCHES AND DISTRIBUTORS IN ALL PRINCIPAL CITIES

WT 50-5

Here are two of the Wagner three phase, non-inflammable liquid filled unit substation transformers installed at Prospect Hill. Each is located as close as possible to the load of the particular areas they serve.

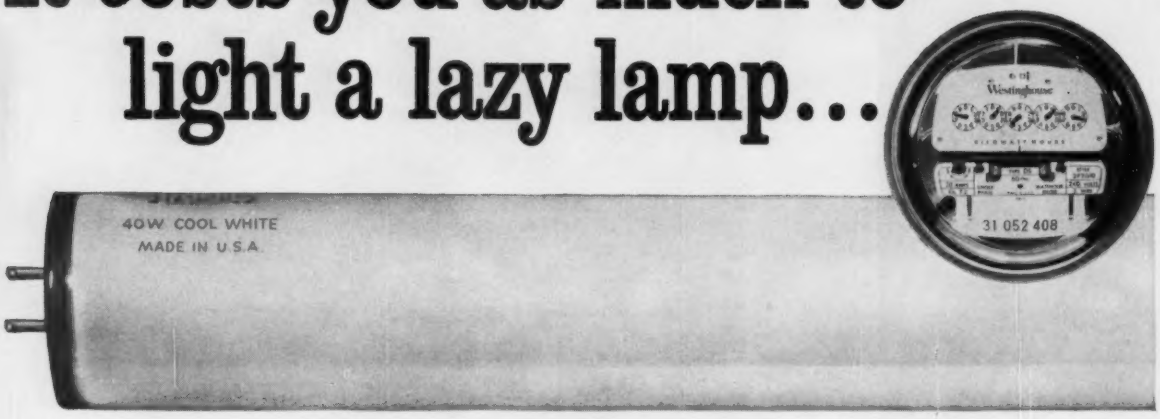


Transformer Triplets ...Born 8 Years Apart!

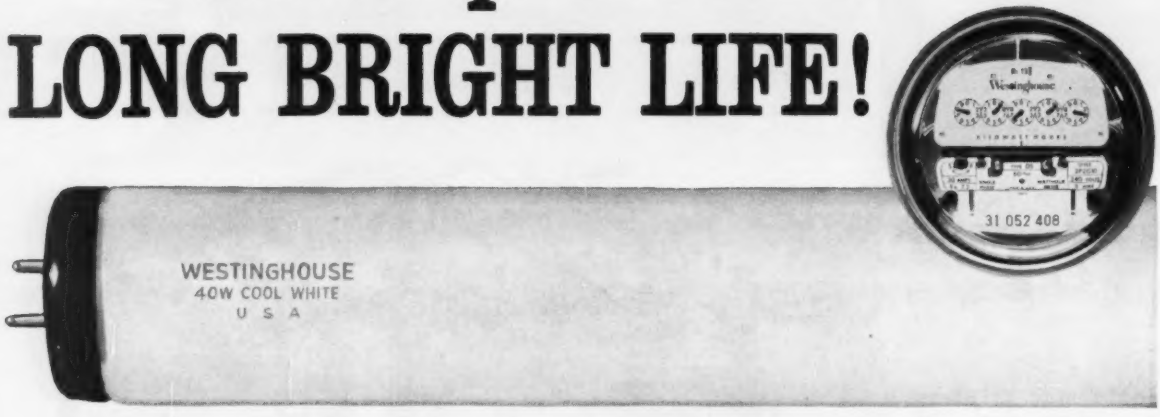
These three Wagner Power Transformers in the main substation at Prospect Hill are identical – although the third unit was built eight years after the first two. They meet the tremendous demand for a dependable flow of power for Missouri Portland Cement Co.

LIVE BETTER ELECTRICALLY

It costs you as much to light a lazy lamp...



as a Westinghouse with "Ultralume" phosphors ...the lamp with the LONG BRIGHT LIFE!



SOME FLUORESCENT LAMPS get "lazy" fast. They eat up the same amount of electricity, but grow dimmer fast. Only Westinghouse fluorescents stay bright as new . . . longer, because Westinghouse lamps have "Ultralume"™ phosphors!

"ULTRALUME" is an exclusive new Westinghouse phosphor that assures maximum brightness for the life of the lamp! "Ultralume" phosphors give you more light per foot of lamp, yet a Westinghouse costs no more to operate than any ordinary lamp.

ALL Westinghouse fluorescents have "Ultralume" phosphors . . . there's one for every business or home use. Specify Westinghouse on every lamp order. Call your local authorized Westinghouse agent or write—Westinghouse Lamp Division, Bloomfield, New Jersey.

Westinghouse (W) FLUORESCENT LAMPS

Turbine spiral case being fabricated of USS "T-1" Steel in the shop of the S. Morgan Smith Co., York, Pa. Plates ranged in thickness from ½" to 1 5/16".

Taming the mighty Snake River with turbine spiral cases of USS "T-1" Steel

Stronger steel reduces weight . . . cuts costs

Four of these huge spiral cases are being built for the Idaho Power Commission for use in the Brownlee Dam on the Snake River near Robinette, Oregon. They are designed for a 250-foot head of water. The inlet is 18 feet in diameter and each turbine will generate 144,000 horsepower at a speed of 128.6 rpm. Water will flow through the cases at a rate of 5,640 cubic feet per second.

Because of the fierce pressure, it was obvious that a strong steel was required. USS "T-1"* Steel was selected because it has a minimum yield strength of 90,000 psi. What's more, it can be fabricated, is readily weldable and has high resistance to impact abrasion.

Cost savings. By using USS "T-1" Steel, there will be substantially less shipping weight across the country and less weld time and weld metal, both in the shop and on the job site. Had carbon steel been specified, double thicknesses would have been required.

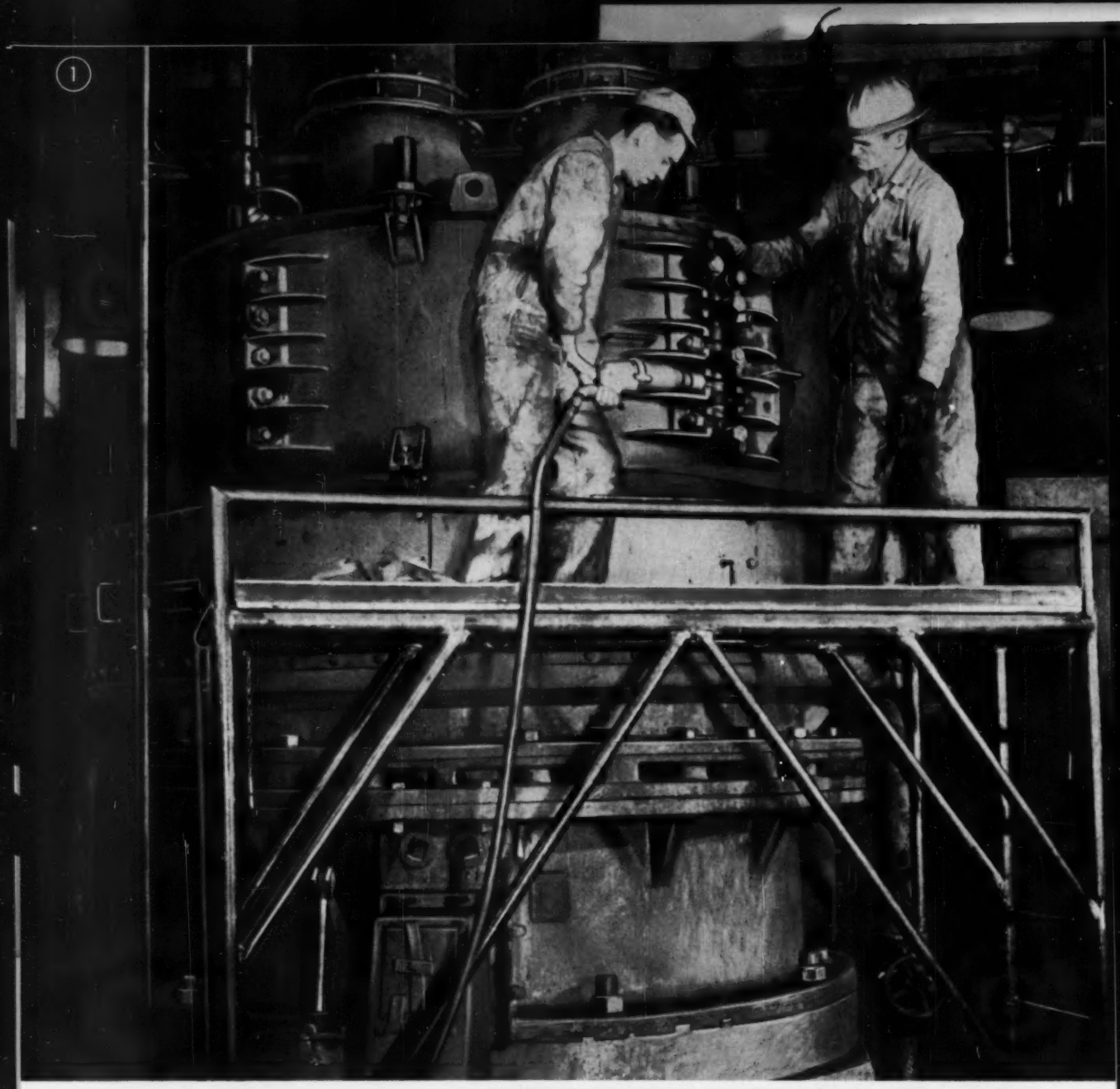
Fabricating operations. Projection of the dimensional outline on the plates was done with Lumitrace. Plates were cut to size by flame-cutting and rolled cold to shape. Some parts were finish welded, others were tack welded and assembled. The spiral case was then disassembled and shipped. Finish welding of segments is to be done at the dam site.

This job points up the economies possible with the use of USS "T-1" Steel. Why not use it for your own equipment? Write for our "T-1" book containing complete information. United States Steel Corporation, Room 2801, 525 William Penn Place, Pittsburgh 30, Pa.

Remember that we also make USS COR-TEN*, USS TRI-TEN* and USS MAN-TEN* Steels . . . widely used in power generation equipment.

*Registered trademarks

USS United States Steel



Representative steps in pulverizer disassembly shown here demonstrate ease and safety of maintenance. Access doors are opened by impact wrenches. Doors are swung back, not removed.

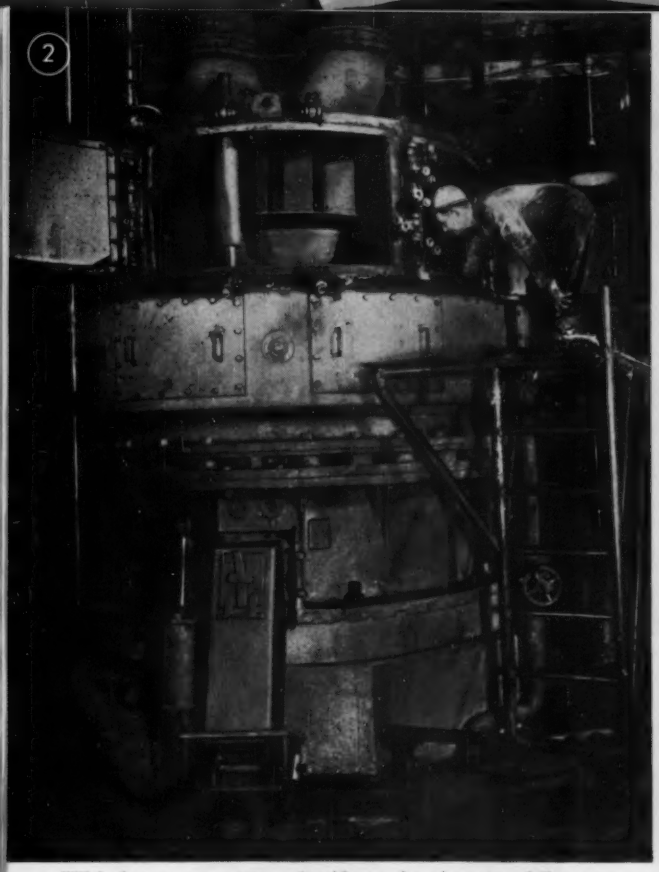
B&W Pulverizer Design Simplicity Cuts Maintenance

Compact Units Handle Low Grade Wet Coal Without Capacity Loss

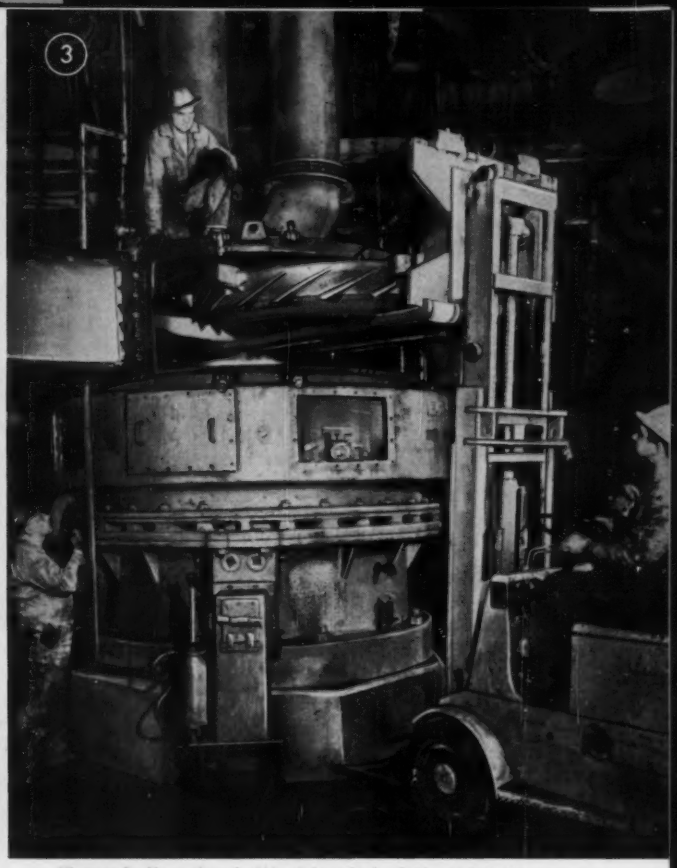
Exceptional output and efficiency records... highlighted by low maintenance... have been established in hundreds of installations by B&W Pulverizers. Their long-range dependability has been accompanied by reduced operating costs.

Fan Maintenance Minimized, shutdowns and maintenance costs reduced because the B&W Pulverizer primary air fan operates with only clean air. As primary air is supplied to the pulverizers under pressure, the fuel piping from pulverizer to burners is greatly simplified.

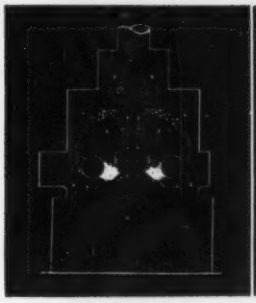
Continuous High Fineness, without reduction in capacity, is assured as grinding surface is maintained with wear. Slow-speed, spring loaded, ball bearing



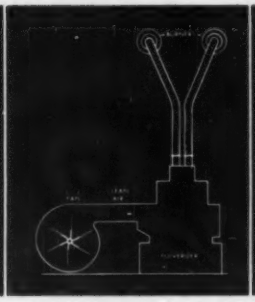
With doors swung open, classifier and spring assemblies are readily accessible for removal. Grinding components are lifted without special rigging.



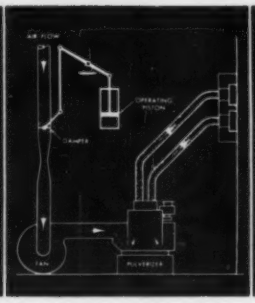
Top grinding ring is lifted by chain falls and, following removal of scaffolding, lifted and transferred by fork lift truck. Lower grinding ring is removed in same simple manner.



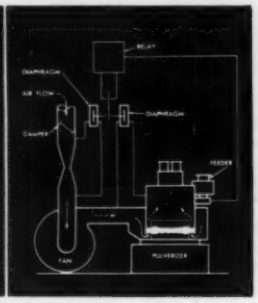
Coal Recirculation assures high fineness, aids drying.



Pressure System eliminates fan wear, simplifies piping.



Air Control maintained at one, simple contact point.



Mill Level Control automatically adjusts fuel-feed.

grinding elements of long-wearing, special alloy material maintain this proper grinding contact throughout their service life. Dependable classification permits only material of proper fineness to leave the unit.

Low Grade Coal, even wet coal, is handled efficiently. Exclusive B&W recirculation of fuel through heated air assures complete grinding, eliminates shutdowns, loss of capacity, and special attention from operators.

One-Point-Contact with the boiler simplifies operation. Boiler's automatic combustion control connects to the pulverizer at the damper in the primary-air duct. The unit's own control system regulates all other functions.

Continuous, Intensive Development by B&W engineers has brought excellent and measurable results to users of B&W Pulverizers. Supported by a national network of plants and engineers, B&W Pulverizers and Pulverized-Fuel Firing Systems open new avenues to operating economy. The Babcock & Wilcox Company, Boiler Division, 161 East 42nd Street, New York 17, N. Y.

BABCOCK & WILCOX

BOILER DIVISION

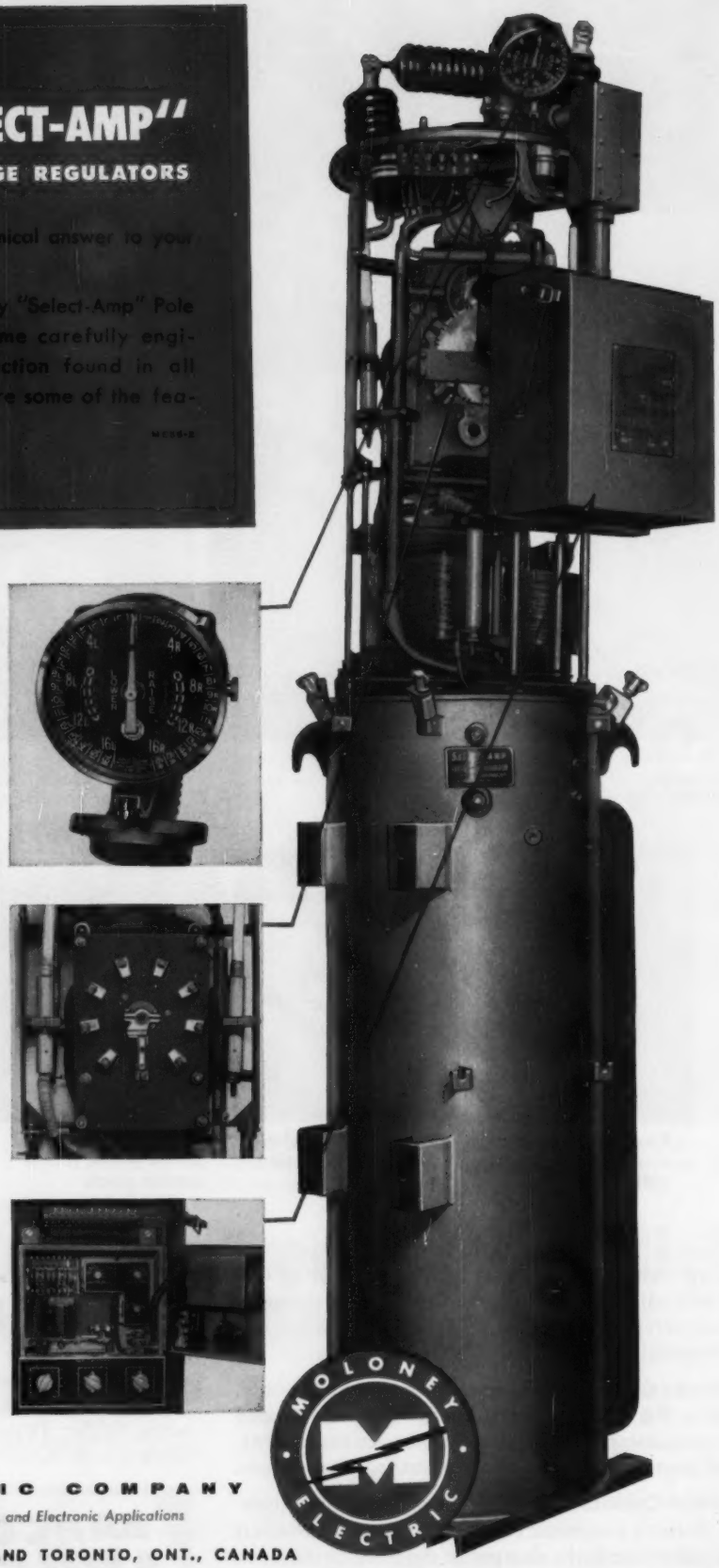
G-844

MOLONEY "SELECT-AMP"

POLE TYPE STEP VOLTAGE REGULATORS

. . . provide an efficient, economical answer to your voltage regulation problems.

The component parts of Moloney "Select-Amp" Pole Type Regulators have the same carefully engineered, high quality construction found in all Moloney transformers. Here are some of the features of this regulator . . .



"Select-Amp"—The Moloney "Select-Amp" feature is controlled from the position indicator and allows the range of voltage regulation to be adjusted from a maximum of plus or minus 10% to a minimum of plus or minus 5%. Reducing the range of regulation to plus or minus 5% permits increasing load current to 160% of normal rating. The voltage is raised or lowered in ⅝% steps.

Position Indicator—is directly coupled to the drive mechanism. Resetable drag hands on the position indicator indicate the highest and lowest position the regulator has reached. These drag hands may be reset by operating the reset lever with a hook stick. The position indicator is mounted at an angle to facilitate observation of indicator from the ground.

Moving Contact Assembly—consists of arc-resistant copper tungsten contacts contained in beryllium copper clamps, aligned with beryllium copper springs and compressed with coil springs to obtain correct contact pressure. A spring loaded accelerator provides "quick-break", "quick-make" action to all switching, thereby minimizing arcing time, consequently reducing contact wear.

Stationary Contact Blade—is made of copper chrome alloy and is tipped with copper tungsten to minimize arc erosion.

Mounting Panel—is made of heavy bakelite to provide an insulating panel for mounting the switch contacts.

Control Cabinet—The hinged front cover is gasketed and is secured by toggle clamps thereby affording both weather-proofing and accessibility. The toggle clamps are provided with padlock eyes so that the cabinet may be locked to prevent tampering. The cabinet is bolted to brackets on the tank wall and may be removed for mounting at the base of the pole.

MOLONEY ELECTRIC COMPANY

Manufacturers of Transformers for Utilities, Industry, and Electronic Applications

FACTORIES AT ST. LOUIS 20, MO. AND TORONTO, ONT., CANADA

Editorial Comment

FEBRUARY 24, 1958

National Utility R/W Organization Is Needed

Next week in Chicago Electrical World will sponsor its second conference on utility right-of-way and plant site problems. Again we undertake sponsorship because we believe R/W is one of management's most troublesome problems.

Work in organizing this second conference strengthens our opinion that a national utility R/W organization is vitally needed. The meeting is undertaken at the behest of and upon the insistence of men in electric utilities who deal daily with R/W and site acquisition problems. With few exceptions they have expressed the need for such a national organization.

Creation of the new real estate section in the Southeastern Electric Exchange and stepped up activities within the American Right of Way Association show the need for a national organization for utility right-of-way men.

Such an organization may be achieved through an ARWA committee, an Edison Electric Institute committee, or possibly through formation of an independent body devoted exclusively to electric utility R/W and site problems.

Once an appropriate committee or organization is formed, Electrical World will be happy to contribute all information and materials accumulated during our two R/W conferences. We'll be happy, too, to continue our full coverage of utility R/W and site acquisition matters.

Railroad Electrification Holds Hidden Promise

How would you like to have a new customer whose load would be about 8% of your present system load and have a load factor of 55 to 65% as well as favorable diversity?

This is just about the size and type of load that would be offered the utility industry if the railroads were to be completely electrified. Individual utilities would not of course share equally in the load attained if such a scheme were undertaken. But it should be attractive to most U. S. utilities.

With utilities today in constant need of adequate rights-of-way facilities for expanding facilities a scheme has been suggested that would be mutually beneficial to both utilities and railroads. The scheme is this:

Why not use railroad rights-of-ways for utility transmission lines and tap from these lines the necessary power to run electric locomotives? Railroad electrification no longer requires special frequency, as foreign experience shows.

Such an arrangement would provide electric utilities with an additional source of revenue as well as greatly needed right-of-way facilities. To the railroad it would provide a way to electrify its system without providing the complete installation capital required initially.

Such a scheme would of course present technical problems such as phase unbalance to utilities. But preliminary studies indicate that this can be solved without extensive use of phase-balancing equipment. Microwave could be an acceptable solution to the problem of prior call of communication lines on railroad right-of-way.

The remaining problems, particularly the financial ones, may prove to be difficult. But the possibilities of such a scheme are at least worth the cost of investigation particularly in view of the utilities crying need for more right-of-way.

Huge drifts like these in Eden, N. Y., plagued half the nation as . . .

Big Big Freeze Sends Output Up, Sets

Wave of arctic weather is seen as direct cause of three new output peaks and rising power demand in storm-hit area

The near blizzard which blasted its way across half the nation last week and the polar temperatures which accompanied it, left in its wake at least three all-time record output peaks and a general increase in output in the affected areas.

These effects of old-fashioned winter weather on power output were reported to Electrical World in an informal survey which queried over 30 of the nation's electric utilities and power suppliers.

The brunt of the winter storm, with its heavy snows, biting cold, and often gale-force winds, fell in the northern sections of the country, from the Mississippi to New England. In that area, snowfalls up to 42 inches, drifts six to seven feet deep, and temperatures as low as 33 degrees below zero were reported.

But the traditionally sunnier states—Georgia, Florida, Louisiana, and others—were also barraged with cold winds from the north. Tallahassee, Fla., had a record three-inch snow, and the thermometer dropped to a snappy 21 degrees in Pensacola.

New all-time peak loads were established by three utilities: Ohio Power Co and Indiana & Michigan Electric Co, two of the largest American Gas & Electric utilities, and Tennessee Valley Authority.

All three reported that electric home heating was a large factor in establishing the peak loads during the cold wave. Electric house heating (heat pump or resistance) is especially popular in Indiana and northwestern Ohio, and there are over 10,500 home heating customers in the seven-state system, said AG&E. TVA reported that "With about 200,000 electrically heated homes in the area, loads affected by weather have been greater than normal."

Ohio Power set its new peak of 1,622,000 kw on Monday, Feb. 10, topping the former peak of 1,601,000 kw, reached on Nov. 25, 1957.

Its sister utility, I&M, set its peak of 982,000 kw on the same date. Previous record peak was 954,000 kw on Jan. 20, 1958.

New peak demand for TVA, recorded on Monday, Feb. 17, was 9,415,000 kw. Previous peak was 9,339,000 kw on Dec. 11, 1957.

Electrical power output in the cold wave area showed an increase in almost all cases. This increase ranged from "only slight" to about 4½% above normal.

New Peaks

Representative of the various reports were:

● Cleveland Electric Illuminating Co, which estimates cold weather "must have boosted electrical consumption by over 3-million kwhr per week" because of temperatures ranging 22 degrees below normal since Feb. 9. It added that although this coldest week of the winter was also the sunniest, the "effect of brighter daylight was outweighed by cold wave effects."

● United Illuminating Co, whose power production "increased more than 2% during the week of Feb. 9-15 (35,813,000 kwhr) over the previous week (34,979,000 kwhr) when weather was "more seasonal." But, it added, electrical output for the second week was 522,000 kwhr less than the total for the similar period last year. Decrease was mainly attributed to the "slowdown in industrial activities."

● General Public Utilities, which felt that cold weather "may have accounted for a 2 to 2½% increase in kwhr sales for the 6-day period beginning Feb. 8, 1958, over the corresponding 1957 week." On the other hand, it noted a 4¼% drop in industrial sales for January, 1958, over January, 1957.

● Philadelphia Electric Co, which reported rise of 2-million kwhr over last year's daily power output. System peak load, it said, increased 50,000 kw because of cold weather. But while daytime base load ran about 2½% ahead of last year's, evening load is about the same as a year ago, "no doubt reflecting cutbacks in industrial second shifts."

● AG&E System, which showed peak load during week of Feb. 10 up from 20,000 to 100,000 kw from the previous week. It estimates that of the 13-million kwhr (or more than 2½%) increase in system output above the previous week, two-thirds is "attributable to the unusual cold spell." Temperatures averaged about 20 degrees below the former week. An AG&E spokesman said in addition to electric house heating, another factor affecting this year's increase is the new aluminum reduction plant of Kaiser Aluminum & Chemical.

● Detroit Edison Co, whose sales were up some 7-million kwhr, or about 3% of weekly output because area temperatures Feb. 6-13 were 18 degrees below same period last year.

● TVA area, which showed system output, was 3% greater than normal "as a consequence of the cold wave." The strongest factor affecting TVA's load, said a spokesman, has been the softening of the steel and aluminum markets, along with the reduction by AEC in its short-term power requirements." But reductions were "more than offset" by new or expanded industrial plants, he said.

● Boston Edison Co, which estimated that "slightly below normal temperatures contributed to a 3.7% gain over the comparable 1957 period." Load improvement is also attributed to "continuing growth of the electronics industry."

● Oklahoma Gas & Electric Co, which said "Kwhr output is running 3% above last week and 4% above two weeks ago. Cloudiness is considered the most important factor in increased consumption, but night kw demands seem to be up about 9 Mw, or 4%.

● Consolidated Edison Co, whose output went to 348 million kwhr during week ending Feb. 16 (compared to 336.4 million kwhr normal), a 3.44% jump. "Only 1.3 million kwhr were attributable to light while the lower temperature accounted for about 10.3 million kwhr of the increase. There were 308 degree days for the week", it reported, compared to a normal for the period of 233 degree days.

● Long Island Lighting Co, which reported cold wave brought electric energy output 4½% over normal. Peak load was 5½% over normal because of cold weather, it said.

● Baltimore Gas & Electric Co, which reports the cold wave "added about 2,000 Mwhr to our output."

● Florida Power & Light Co, which said, "Our system was taxed to its fullest capacity" during the big Florida freeze. FP&L picked up 60 Mw from Florida Power Corp and Tampa Electric Co. Despite this incoming power, though, a low-voltage condition was "pretty general."

● Niagara Mohawk Power Corp, contrary to most storm-hit areas, said "Old Man Winter's bitter assault had only a slight effect on our load level." A small dip in load was caused by plant shutdowns and worker absenteeisms during the height of the storms. It said the only other factor affecting its load was "a drop in industrial production."

In contrast to the winter weather plaguing most of the nation, the West and Pacific Northwest enjoyed a period of mild weather, on the whole. No peaks were reported, and output was below normal in some cases.

Because of "above normal temperatures and economic conditions," Bonneville Power Administration loads are down 280,000 average kw below February's estimate of 2,450,000 kw for firm loads and down 210,000 kw in interruptible loads (decreases of 11% and 45%).

Although California had no cold wave, a slower than normal rate of load growth was reported. Causes were larger than normal rainfall in the service areas of one utility, and economic leveling off in another's.

Capitalized Pay Gives Tax Benefits

Court rulings show that utilities can deduct full salaries of officers in computing the company's federal income tax

WILLARD F. STANLEY,* Brooklyn, N. Y.

How do you handle officers' salaries?

If the electric utility industry were a static one, the answer would be immaterial. But because it is one of the continually and most rapidly expanding industries, the answer is of considerable importance: It affects earnings, cost of new facilities, rate base, and income tax liabilities.

The uniform accounting systems prescribed by both the Federal Power Commission and the Association of Railroad and Utility Commissioners provide that officer or employee time spent on construction of new facilities is not an operating expense, but shall be capitalized as part of the cost of the facilities.

Most electric utilities have followed this practice for many years. As a general rule this treatment is desirable because it improves current earnings. More important, it creates a higher base for rate-making by upping cost of added property.

For federal and state income tax purposes, most utilities treat officers' salaries the same as on their books. Possibly, however, they do not realize that federal income tax law, as interpreted by federal courts, permits the full salaries of officers to be deducted as an income-tax expense, where it is reasonably assumed that the officers would have been employed at their current compensation even though the company was not building new facilities. Apparently these court decisions apply whether or not the company capitalized a portion of officers' salaries as a construction cost.

Some utilities capitalize on their books that portion of officers' salaries earned on construction, while deducting their full salaries for federal income tax purposes. It is understood the Internal Revenue Service has not disputed these total salary deductions.

Because the treatment of officers' salaries, both on the books and for income tax purposes, is not disclosed either by financial statements or the usual statistical data, little is known about how utilities handle it. But it is safe to assume that most capitalize the construction portion of officers' salaries, and only a few deduct the entire salaries in computing taxable income.

Provides Two-Pronged Benefits

Following this two-pronged accounting procedure gives the utility two benefits: An increase in current earnings, and a gain in free use of deferred taxes. Basically this resembles the gain from the free use of tax deferrals under accelerated amortization and liberalized depreciation.

The "differential" treatment of the construction portion of officers' salaries creates a tax base for the new facilities lower than the cost recorded on the books. This reduces depreciation deducted annually for tax purposes to an amount correspondingly below that reflected on the books. By the end of life expectancy, the aggregate of all these annual reductions should equal the difference between full salary and that part allocated on the books to operation and maintenance.

Thus the company will pay the same amount of income taxes over the life expectancy of the property additions, regardless of the treatment elected (assuming unchanging tax rates). But the company employing the "differential" treatment will benefit from the free use of taxes equal to the officers' salaries capitalized on the books for one-half the life expectancy of the additions.

The table below shows the estimated amounts of increased annual net earnings and gain from free use of the deferred taxes, which various sized utilities should realize in adopting the "differential" treatment. This table assumes:

- 30% of officers' time is spent on construction work.
- Federal income tax rate remains at 50%.
- Overall cost of raising the funds which would be required by the company if it did not have free use of deferred taxes is 6%, compounded to arrive at total economic gain.
- Life expectancy is 40 years.

Companies with larger or smaller officers' salaries than those in the table would gain proportionately. The same is true of companies whose officers spent other than 30% of their time on construction. Assuming a constant expansion rate, larger companies would gain more by adopting the "differential" treatment. Companies expanding rapidly and continuously (presumably with the highest percentage of officers' time devoted to construction) would gain more in proportion to their size.

The "differential" treatment would require keeping separate records for federal income tax purposes. But this is not new to utilities, and the benefits would more than offset the added expense.

Here's What This Accounting Method Can Save You

Assumed Aggregate Amount of Annual Officers' Salaries	Earnings Increase, Year Salaries Paid**	Average Annual Earnings Increase, Ten Years*/***	Economic Gain, One Year	Economic Gain 10-Year Aggregate*
$100,000	$14,812	$14,062	$33,000	$330,000
200,000	29,625	28,125	66,000	660,000
300,000	44,437	42,127	99,000	990,000

* Assumes same amount of officers' salaries for construction in each such year.
** 50% of amount of salaries for construction in year less 1¼% for the reduction in tax depreciation due to exclusion of such portion of salaries from tax base.
*** 50% of amount of salaries for construction in year less 6¼% for tax depreciation for five years due to exclusion of such portion of salaries from tax base.

*Retired vice president, Southwestern Public Service Co.

'Certain Ad Expenses Not Deductible'

Ruling by Internal Revenue bars electric utilities from deducting contributions for "political or propaganda" ads

Contributions by electric utility companies to advertisements sponsored by "America's Independent Electric Light and Power Companies" will not be allowed as a business expense deduction in corporate income tax returns.

That's the word from the Internal Revenue Service. Commissioner Russell C. Harrington announced the ruling in a letter to Sen Estes Kefauver (D-Tenn.). Harrington launched a field investigation of the advertising program after inquiries were made by Kefauver.

Checking System Is Set Up

A directive from the revenue service has gone out informing all field offices of the ruling. The directive reportedly lists the individual companies participating in the ads, so that field offices may easily pull income tax returns and check on how ad contributions were reported.

It is also understood that the directive, in addition to specifically naming "America's Independent Light and Power Companies," also mentions the "National Association of Electric Companies." Since NAEC does not itself place any advertising, the government presumably also wants its field offices to check corporate returns to see how utilities are reporting contributions to the national trade association.

Observers see the ruling as eliminating tax deductions for anti-public power advertising placed by private companies. Kefauver, in attacking private electric power ads last year, said they were "political propaganda, pure and simple." Kefauver said the ads "claimed people in the TVA area don't pay their share of taxes, attack government appropriations for dams and steam plants, and equate public power and socialism."

Kefauver, in releasing the text of Harrington's letter, also traces the correspondence between Harrington and himself since last February, when Kefauver asked the service to look into the matter. Kefauver clearly feels he has won support for his charges in getting an IRS ruling specifically disallowing tax deductions covering the advertisements.

Last March, Commissioner Harrington told Kefauver he had ordered a field office investigation of the advertising. At that time, Harrington said the law clearly requires that advertising expenses, to be deductible, must be ordinary and necessary and bear a "reasonable relationship to the business activities in which the enterprise is engaged."

Harrington also said in March that Internal Revenue has "consistently" not allowed deductions for expenditures incurred for "lobbying", for the "promotion or defeat of legislation," for "political purposes," or for "development or exploitation of propaganda."

Harrington next reported to Kefauver last December, saying the field check had been completed and was being studied in the Washington IRS office. He also said the field offices had been ordered to flag income tax returns for 1956 filed by the participating companies, so that auditing could begin.

In his letter announcing the final decision, Harrington says "It has been held that the contributions paid by the participating electric companies for the advertisements mentioned above do not constitute allowable deductions."

Apparently mostly involved in the ruling is much of the Electric Company Advertising Program (ECAP), sponsored and paid for by members of America's Independent Light and Power Companies. The program has been a major target of criticism by federal public power partisans, such as Kefauver and Sen Albert Gore (D-Tenn.). Sen William Langer (R-N.D.), and Rep Lester Johnson (D-Wis.) have introduced bills aimed at banning such advertising.

Company reaction to the ruling came from Charles E. Oakes, chairman of the Pennsylvania Power & Light Co. Oakes said advertising to meet competition is held a "proper business expense for both corporate and tax purposes." "It should make no difference," Oakes argued, "whether the competition is from other business enterprises or from the federal government."

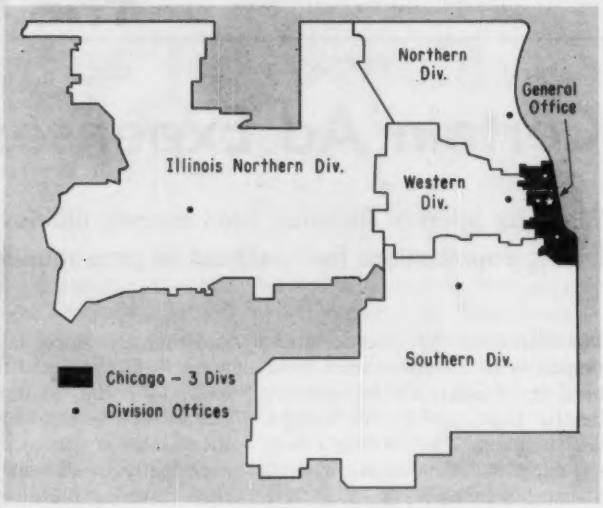
PG&E to Build A-Plant Unassisted

Pacific Gas & Electric Co has announced it will build a 50,000-kw atomic power plant without any government financial help or research and development subsidy. With this news Adm Lewis Strauss last week opened annual hearings on the state of U. S. atomic power progress.

PG&E has signed a fixed-price contract (price unspecified) for the reactor at Eureka, Calif. The plant is to be completed by the end of 1962, and PG&E is optimistic it will begin producing competitive power "costing 8 mills with the second core and present plutonium credits. We expect to approach this goal with the first core," it said.

Ultimately the plant will produce 60,000 kw, and have a thermal rating of 165,000 kw, said PG&E. It would include several nuclear advances such as complete internal steam separation, and others.

Strauss said PG&E's decision supports his view that the government should limit its activities largely to research and development. He said our atomic industry should be able to "begin design and construction of economic nuclear power plants abroad within five years."



Distribution line construction is the responsibility of the wide-spread divisions . . .

Commonwealth Ed Decentralization

Commonwealth Edison Co (Chicago) has licked "the curse of bigness"—without throwing away the economy and efficiency of big scale operation. How? By centralizing and de-centralizing all at once.

Commonwealth Ed is the product of several mergers. It embraces 11,000 sq. mi, collects a $372 million annual revenue. Big system operation has reaped many benefits, including big scale financing, purchasing economy, system coordination and development, large scale plant improvements, high voltage transmission and 345 kv interconnections with other systems.

But the company realizes that certain advantages could be swallowed up by wholesale centralization, advantages like individualized service to customers who range from farmers to wealthy suburbanites to slum dwellers. And it knows there's no substitute for a close-up view of community relations or distribution problems. So it keeps many such functions decentralized.

Breaking Down Operations

Commonwealth Ed breaks operations down into several geographic divisions, each headed by a VP. Population density largly determines their area. Some follow pre-merger company boundries. The three divisions within Chicago serve 50% of Commonwealth Ed's customers, but cover only 2% of its area. Headquarters—the general office—coordinates the divisions' commercial and operating activities, provides promotional and other specialized services.

At the general office a vice president in charge of division operations handles coordination. Operations outside the scope of the divisions are headed by a vice president in charge of engineering, construction, and production. Under him are managers for power production, construction, engineering, and research. Many of these activities fall partly under division operations. The volume and degree of repetition of an activity help determine its control center.

Basic centralized activities include: policy making, financing and accounting, purchasing, system planning, work and equipment standards setting, all research, and bulk power system engineering, construction, and operation.

Here's how the other functions are assigned.

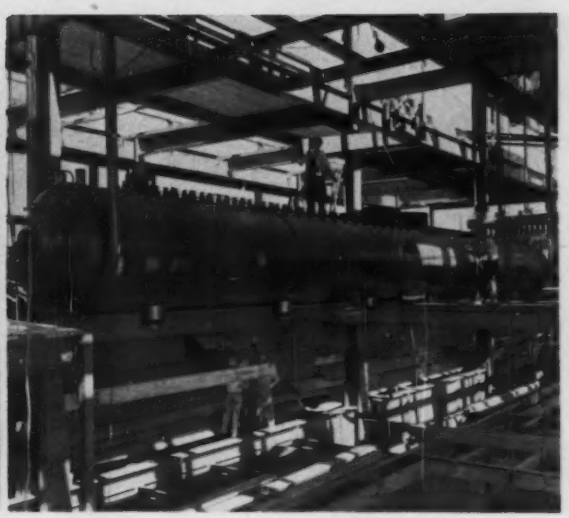
Production Is Centrally Controlled

At headquarters the manager of production controls operation of the bulk power system. He is also responsible for operation of generating stations, major transmission lines and substations, and testing.

But each generating station is responsible for its own performance.

Commonwealth Ed decentralized these functions:

- Construction and operation of distribution systems
- Most subtransmission construction and operation
- Operation and maintenance of transmission lines
- Distribution design and engineering and most distribution planning
- Administration of all local transportation activities
- Substation construction and maintenance are now centralized, but will probably become division functions later on.



. . . but bulk power supply is centralized . . . and so is power plant construction

Keeps Benefits of Central Control

Major construction is a feast or famine function requiring large crews, so much of it is centralized and contracted. The manager of construction at headquarters holds responsibility for building power plants and major transmission facilities. Substation construction and maintenance are now centralized, will probably become division functions later on.

Divisions Do Much Construction

Decentralized construction has already made headway. Distribution system construction and operation, and most subtransmission construction and operation, fall exclusively within division lines. They also have a big effect on public relations. So the division operating superintendents with their combined crew of 2,800 report directly to their division vice presidents. Operation and maintenance of transmission lines also fall within the realm of the separate divisions. But policies, equipment standards, and work practices originate at the central office.

Engineering Is Mixed

Bulk power system—Because system-wide considerations determine the location, size, and shape of new generating units and high voltage transmission lines, bulk power planning is centralized.

Stations—Engineering and designing of station electrical, structural, and mechanical facilities are also centralized.

Transmission & distribution—Transmission design is centralized in its own department. But distribution design, because it is so closely related to customer needs, is a division function along with operation.

At headquarters, distribution engineering is a "staff function," serving the divisions. The centralized project engineering department relieves the divisions of distribution planning in large or non-repetitive jobs. This department also designs transmission and distribution projects on the 34.5 kv and lower voltage systems, larger electric service stations, and the smaller distribution centers.

Efficiency Is the Criterion

In general, the project engineering department handles engineering whenever centralization is most efficient, As the divisions expand, Commonwealth Ed plans to gradually decentralize these functions.

Transportation policy and purchases are centralized, so equipment is standardized throughout the system. The general office department also sets basic preventive maintenance programs and supervises the central auto shops. But the divisions administer all local transportation activities.

But kept these activities under the main office:

- Formulation of all policy
- Financing, purchasing, and accounting
- Setting of all work and equipment standards
- Bulk power system planning, engineering, construction and operation
- Promotional and other special services
- Operation of generating stations, major transmission lines, substations
- Transportation policy and purchases, and the central auto shops.

RECORD TURNOUT of more than 6,400 NRECA members heard Manager Clyde Ellis charge Administration with "double-crossing" rural electrification by low loan recommendation and a proposed REA Act amendment

Contrasts Mark 'Stand-Your-Ground'

In time of 'gravest peril' REA systems' net worth has doubled since '52. Campaign stepped-up against interest rate hike

It was a good week for contrasts. While Dallas, Tex., experienced spring-like weather, big sections of the U. S. were hit with snow and freezing temperatures. Convention-goers at National Rural Electric Cooperative Association's annual meeting bunched together along the narrow four-block section of sidewalk from the Adolphus Hotel to the spanking new Dallas Memorial Auditorium in garb ranging from Stetsons and Western-cut styles to smart business suits and even an occasional Madison Avenue touch.

Some marked contrasts greeted the more than 6,400 members.

In the first instance it was Clyde Ellis, the group's general manager, who professed, in somber tone, "I am only a small voice crying in the wilderness" as he warned of "grave peril" facing rural electrification.

His alarm was pegged to a "double-cross" by President Eisenhower. All segments of the Administration touching the program, excepting REA itself, "have joined the profit power companies in total war against the program," Ellis charged.

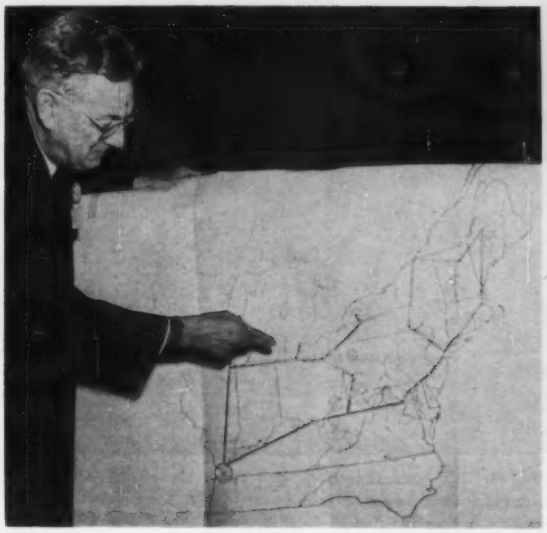
The big siege, as he sees it, comes from two Presidential salvos: 1. Providing "us just enough loan funds to run us past the November election." 2. A proposal for an REA Act "insured loans" amendment that would "eliminate all future REA loans after about Dec. 31 and turn us away from REA and into the open money market."

The proposed amendment would, Ellis said, set up the Secretary of Agriculture as top man and "it would be the end of REA Administrator David Hamil." It would neither insure nor guarantee "that borrowers can find private capital for the government to insure or guarantee," Ellis said.

Net effect of the amendment would be a 5% interest rate for open market funds plus a 1% service charge, Ellis continued. But co-ops would be unable to obtain half the $300 million financing they need in the next fiscal year, he added, for reasons ranging from "Wall Street" dislike to territorial handicaps.

The next day came States Rights Finley, general superintendent of the

HOT TOPIC on White House proposals to change REA had panel of, from left, W. T. Crisp, K. Scott, and R. A. Dell and Dr Paul Nelson of NRECA's staff



GIANT POWER age, as Leland Olds views it, calls for public-private ownership of power supply "free from monopoly"

VOTE OF CONFIDENCE for Administrator David A. Hamil (center) followed talk on financial gains by co-op

Theme of Co-ops' National Meeting

Electric Power Board of Chattanooga. His topic: Capital financing for TVA. His aim: Passage of the TVA revenue bond financing bill which would allow TVA to "use the private money market for capital it must have to build new generating capacity for normal growth." Finley said they would prefer not to get funds in this manner but it was the only "realistic" solution to the agency's needs.

Ellis called it a curious contrast that the Administration proposes co-ops do their own financing but opposes "workable" legislation to enable TVA to do its own. The Administration knows TVA could do its own financing, he charged, "and we cannot."

Contrasting with Ellis' appraisal of "serious jeopardy," co-ops "have made great strides" to economic strength in recent years, Administrator Hamil said. Net worth of the systems has jumped from $169 million six years ago to $478 million today, he said. In the life of the program co-ops have met $507 million in scheduled repayments of principal, deposited $117 million ahead of schedule "as a cushion of credit", and paid $307 million in interest, Hamil said.

The "credit cushion" facet came under discussion in one panel. Speakers proposed a range from 15% to "as large as we could accumulate" of gross income should be sunk into cash reserves. James B. Polhill, Jr, manager of a Louisville, Ga., co-op, said when he hears a complaint that the co-ops are making a profit on the reserves, "this is the greatest compliment ever paid to our program."

But, a small sampling of members disclosed uncertainty on this score. As one co-op director put it privately: "I don't think it's morally defensible to borrow the money at 2%, then turn around and earn 3% on the $42,000 cash reserve we have."

The move to up interest rates on REA loans was hit by Ellis, re-elected NRECA Pres John M. George, Texas Gov Price Daniel, Sens John Sparkman (D-Ala.) and Ralph Yarborough (D-Tex.), and speakers at many of the panel sessions.

Kenneth L. Scott, Agricultural Credit Service director, however, pointed out that REA was not being singled out in the Administration's reappraisal of spending programs. The need for REA capital funds in the next generation will far exceed $3.5 billion already spent on the program, he said. Eisenhower's recommendation for a $150 million fiscal '59 budget was influenced by the carryover of $25 million and about $600 million in draw-on REA funds, Scott said.

To step-up its fight against an in-

MISS R. E., Brenda Eddings (center) Sydney Stack (r) and Jane McCallum

DESIGN FOR SURVIVAL talk of John M. George (r), re-elected NRECA president from Idaho, gets endorsement by Ellis

TVA FUTURE was theme of Sen John Cooper (R-Ky.), who endorsed TVA revenue bonds 2% REA loan interest rate

terest rate increase and other unfavorable legislation, the association members were urged to step up statewide and local campaigns under the "Minuteman" banner. Minutemen are the corps of co-op members who shoulder arms for grass roots and regional battles.

Dues Are Raised

Voting delegates passed a lengthily debated resolution that will double the NRECA's national campaign funds in 1959. The measure originally called for dues of 11¢ minimum/per connected consumer or a formula payment that would have upped dues by a 50% maximum in 1959 and up to 10% for each succeeding year.

There were strong objections to the compounding 10% increases in later years. The delegates agreed more funds should be available to the NRECA staff for its lobbying and public relations work, but "we need some sort of ceiling," said one voter.

Debate was settled by an amendment stipulating that dues will not exceed 18.75¢ per connected consumer per year. This will hold 1959 payments to a 50% increase.

The resolutions committee did not follow the lead of an earlier NRECA regional meeting, which had asked for study on an anti-trust suit against private power companies, their agencies and organizations. There was an interesting similarity, speakers said, between a suit brought against eastern railroads by a trucking association. The railroads were held guilty of a "big lie" technique in undercutting truckers' business by means of distorted publicity. Parallels exist between electric companies' advertising on government competition and the railroads' campaign, it was charged.

One resolution opposed a rise in interest rates and "formation of any investigatory Hoover-type commission to analyze or investigate the REA and rural electrification program."

$300 Million for Loans

The group asked for regular loan funds of at least $300 million in another measure. Added to this would be $9.5 million for administering telephone and electric loans and a minimum of $1 million for both fiscal 1959-60 to study uses of electricity on the farm.

Also adopted were resolutions in support of TVA revenue bond financing similar to the Davis-Jones bill as approved by the House Public Works Committee; stepped-up construction of authorized multi-purpose projects; continuation of the preference clause plus construction of federal, self-liquidating transmission lines to firm up power and protect preference rights of co-op systems; and a Congressional study leading to a long-range investment program to develop natural resources.

William T. Crisp, Tarheel Electric Membership Association, substituted for J. E. Smith of Chase City, Va. Crisp told of potential benefits in coordinated co-op sales efforts. By projecting the figures of a four-month range sales push by 18 co-ops, he said 360 U. S. systems in 20 states could accomplish:

- $9 million in range sales.
- Add 60-million kwhr of load.
- Produce $1.2 million additional revenue per year for co-ops and a $1.6 million profit for dealers.

National coordination would reach all the way to the factory level, Crisp said. It could even bring special model appliances adapted to the program by manufacturers, he added.

Olds Backs Joint Ownership

Private power companies are out "to exploit giant power to foster their own passion for monopoly," said Leland Olds, Energy Research Associates, Inc, and former TVA director.

He urged a substitute for the Bricker bill, which would amend the Holding Company Act of 1955. Olds suggested legislation that would welcome private power's joint-ownership approach, "but it should establish federal leadership in planning the most economical regional power supply," he said, "and should lay down the rules for establishment and operation of the wholesale power systems" to protect public interest.

Olds said that the Electric Consumers Information Committee is underway on its second draft of proposed legislation for an "Electric Power Supply Act."

Nebraska Clips a Bomb Fuse

Squabbles that racked two-thirds of all-public power state appear to be solved by integrated-operation proposals

Back in the Thirties, when the Rural Electric Administration and federal power got their start, three power districts were set up in Nebraska. The trio later banded together as the Nebraska Public Power System to generate and sell hydro power at wholesale to 27 rural power districts, Consumers Public Power District and municipals.

When the three hydro districts came on the line, they found themselves with big blocks of power for which there was no market. To provide an outlet, the Consumers district was set up. Its function was to distribute both by wholesale, but mostly by retail, NPPS power.

The arrangement—NPPS generating and Consumers distributing—accomplished the two agencies' aim. But in an activity where integrated operation is a key to efficiency, the separation of functions was a time bomb that in recent years threatened to detonate with a force that could wreck the setup.

Issues That Ignited the Fuse

Issues that marked the sputtering of the bomb fuse included:

- The state's Supreme Court ruling sanctioning Consumers entry into the generating business. When the agencies agreed four years ago that a new plant was needed, NPPS sold bonds at 4% interest to finance it. Several rural districts (with Consumers as an intervenor) filed suit to stop the project, claiming an estimated interest rate of 2.75% available to Consumers would save more than $10 million over the bonds' life.
- About a year ago, rural districts served by NPPS signed a new 35-year contract. The agreement, in effect, says that NPPS will not sell power to others at a lower rate than the rurals pay. Municipalities may contract for the same rate paid by rurals. Consumers felt this would put it into a squeeze allowing rurals and NPPS to underbid on power sales to towns.
- As negotiations between Consumers and the Atomic Energy Commission stretched out for a 75-Mw nuclear plant at Hallam, Consumers modified its plans. It will build a conventional 100-Mw plant by 1960, then convert to atomic fuels by '62. NPPS believed this development would idle some plants or hurt federal power prospects.

These and other issues added to the deadlock. Late last year negotiations began on a "peace" settlement. The basic objectives will be cemented April 1 by long-term pacts.

Directors call the agreement "the closest thing to an integrated one-system operation.

Main points provide for **1.** A joint two-man operating committee with one representative from Consumers and one from NPPS. **2.** Consumers support of the bid of Nebraska Electric Generating & Transmission Cooperative, Inc—which has NPPS backing—to finance a 230-kv line from the Missouri Basin to the South Dakota border.

Consumers and NPPS will cooperate in securing maximum utilization of U. S. Bureau of Reclamation power from the Missouri Basin, under the agreement. Consumers will continue to buy specified amounts of NPPS power until 1972.

California Style 'Air Lift' Sets Poles

Neither rugged mountain country, inaccessible forests, deep canyons, nor steep slopes can prevent electric utilities from setting poles or stringing lines where they're needed. And now, if they find it can't be done by ground crews, they simply take to the air.

Faced with these very obstacles in California's Los Padres National Forest, Pacific Gas & Electric Co recently used a helicopter to successfully complete installation of three miles of new power lines.

First the copter was used to drop 59 poles into holes previously dug by ground crews, who then filled and tamped the holes. Then, to string the three strands of wire for the 12-kv line, the copter (above) made a number of passes over the cross arms of the poles, and the job was done.

The News-Beat

Sporn Appraises A-Power

Coal will dominate the power generating field for the near future, according to Philip Sporn, president of American Gas & Electric Co. He told the annual technical dinner meeting of the New York M.I.T. Club, "We are entering a period of reliance on coal which will last for 20 to 25 years.

"Neither this generation of reactors nor the succeeding generation will give us economic nuclear power," he said.

'Phantom' in Stock Options

A "phantom" alternative to company stock option plans for officers and key employees is increasing in popularity, according to Willard F. Stanley, retired vice president of Southwestern Public Service Co.

"Instead of granting options to purchase a specified amount of stock at a specified price, the company agrees to pay the officers and employees, upon retirement, amounts equal to the accumulated profit on a set amount of stock above a set price, plus the amount of dividends paid on this stock," says Stanley.

The alternative is called the "phantom stock" plan since no stock actually is involved, he says, but payments are based on accumulated profits and dividends as though it was. Benefits go to the officers—employees upon retirement. Meanwhile the company gets a deduction for income taxes of the amount it pays. Under the stock option plan the company gets no tax deduction, Stanley points out.

FPC Says U.S. Should Pay

Federal Power Commission wants the federal government to reimburse private power companies for benefits accruing to the government from upstream facilities constructed by the companies. In its annual report to Congress, FPC asks legislation amending Section 10 (f) of the Federal Power Act "so as to require not only reimbursement by non-federal power developers for benefits accruing to them from upstream facilities constructed by another, but also to require reimbursement by the U. S. for improvements constructed by non-federal interests."

Commissioner William R. Connole opposes the recommendation on grounds it exceeds FPC jurisdiction. Other highlights of the commission's legislative recommendations include:

- That rate-changing procedure of Section 205 of the Federal Power Act be made available to companies seeking to change a filed contract where the purchaser has not agreed to the change. A federal appeals court has ruled that natural gas companies, at least, cannot file for rate increases without consent of all their customers. FPC wants Congress to clarify the matter both for gas and electric companies. However, no legislation has been introduced as yet.
- That the act be amended to require FPC approval of plans to abandon or curtail interstate electric facilities or service. The commission already has such power over natural gas companies.
- That Section 202 of the act be amended so FPC can compel the interconnection and coordination of electric power facilities of interstate public utilities when found necessary in the public interest.
- That the commission be authorized to exempt hydroelectric projects of less than 2,000 hp from certain licensing provisions of the Federal Power Act. The exemption line is now drawn at 100 hp.

An estimated 90.1-million kw of hydroelectric power capacity theoretically is available for future development, FPC says in its 1957 annual report. However, FPC notes many potential projects may be uneconomic and unfeasible. Most undeveloped hydro power resources are in Pacific states (33,722,000 kw) and Rocky Mountain states (21,333,000 kw). Only 26.5-million kw of installed capacity have been developed thus far.

Lights Out

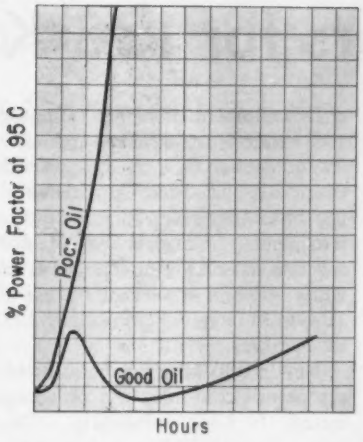
Army helicopters speeded the stringing of telephone lines for Ft. Campbell, Ky., troops on maneuvers. One pilot settled briefly then took off again under the impression his wire-stringing device had been disconnected. It hadn't. In short order he'd draped thousands of feet of line across pastures, woods, streams, and roads. It also clipped a 66-kv power line, putting out lights in much of the military post and surrounding areas.

British Order 550-Mw Unit

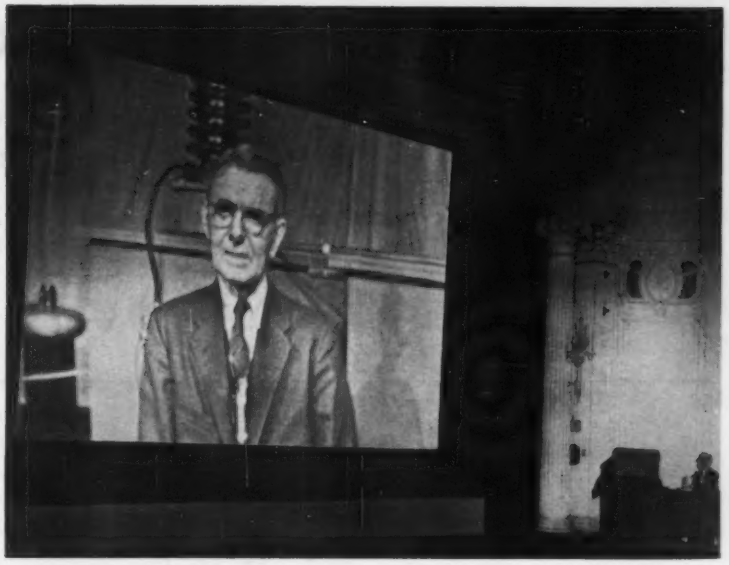
London—A reheat boiler unit of 550-Mw capacity has been ordered by the British Central Electricity Generating Board. The unit will be rated at 3.75-million lb of steam per hour and will work with steam conditions of 2,400 psi at 1,055F.

International Combustion, Inc, will make the unit, which qualifies as the world's largest now under design. Contracts for the turbo-alternating set, which will be cross-compounded from two 275-Mw generators, haven't been let as yet.

Two of these 550-Mw units are projected for a 1,100-Mw station near Doncaster, England at a cost of $112 million.



CURVE of oil loss characteristics was shown on 18-by-24-ft television screen



HOST, F. C. Doble, addressed clients via TV from his firm's laboratories

Doble Telecasts Oil Power Factor Tests

A new means of recording oil power factor continuously under controlled conditions of accelerated aging was presented recently by closed-circuit television at Doble Engineering Co's 25th annual clients' conference in Boston. Some 300 clients witnessed the televised procedure on an 18-by-24-ft screen which also displayed the test results in the form of curves. The curves revealed the distinct differences in loss characteristics of insulating oils refined from several crudes by various refining methods.

Distinguish Good from Bad

The new test for the first time permits evaluation of an oil's chemical characteristics by electrical measurements, F. C. Doble said, in explaining the graphs. When applied to oils of known service performance, he added, the test shows that the method readily distinguishes between good and poor oils.

Also televised was a new means of measuring the power factor of an oil circuit breaker or transformer bushing alive in service. The method was demonstrated by a power factor test on a live 115-kv bushing in the Doble laboratory. This technique is dependent upon the tester's ability to furnish to a power factor measuring apparatus a voltage exactly in phase with the high-voltage transmission line.

This potential source, derived from a capacitor attached to any phase of the high-voltage line, can be used for supplying voltage to the standard Doble bushing testing devices. Thus accurate power factor tests are practicable on any bushing in the yard on that phase. A valuable feature is that the test can be performed without de-energizing the equipment under study.

A special switch found useful for terminating a connection from a capacitance tap of a bushing during the test was also shown.

A third development was also announced. In this, two standard Doble bushing testing devices measured phase difference at different points on the system. This measurement was taken between two adjacent bushings which had a known phase displacement, and showed how this displacement varied. The measurement, indicated by a visual meter reading, was transmitted by the closed-circuit TV and viewed by the entire client group.

In addressing the group, P. L. Bellaschi, consulting engineer, pointed out that, although the economic attraction is great, many utilities still hesitate to use transformers with a two-step reduction in BIL. He stressed the importance of drying the insulation and filling transformers with oil under vacuum.

Oil filling of transformers in the field, said E. L. Raab, General Electric Co, must be under vacuum for all units rated above 69 kv and for all forced-oil, directed-flow units.

Arrester Designs Changed

Certain lightning arrester designs, according to GE's W. H. Eason, are now being changed to make them insensitive to the effect of porcelain contamination. The probability is strong, said B. C. Wentz, Westinghouse Electric Corp, that emergency operation of a faulted transformer can be obtained if the fault is cleared quickly enough to limit insulation burning.

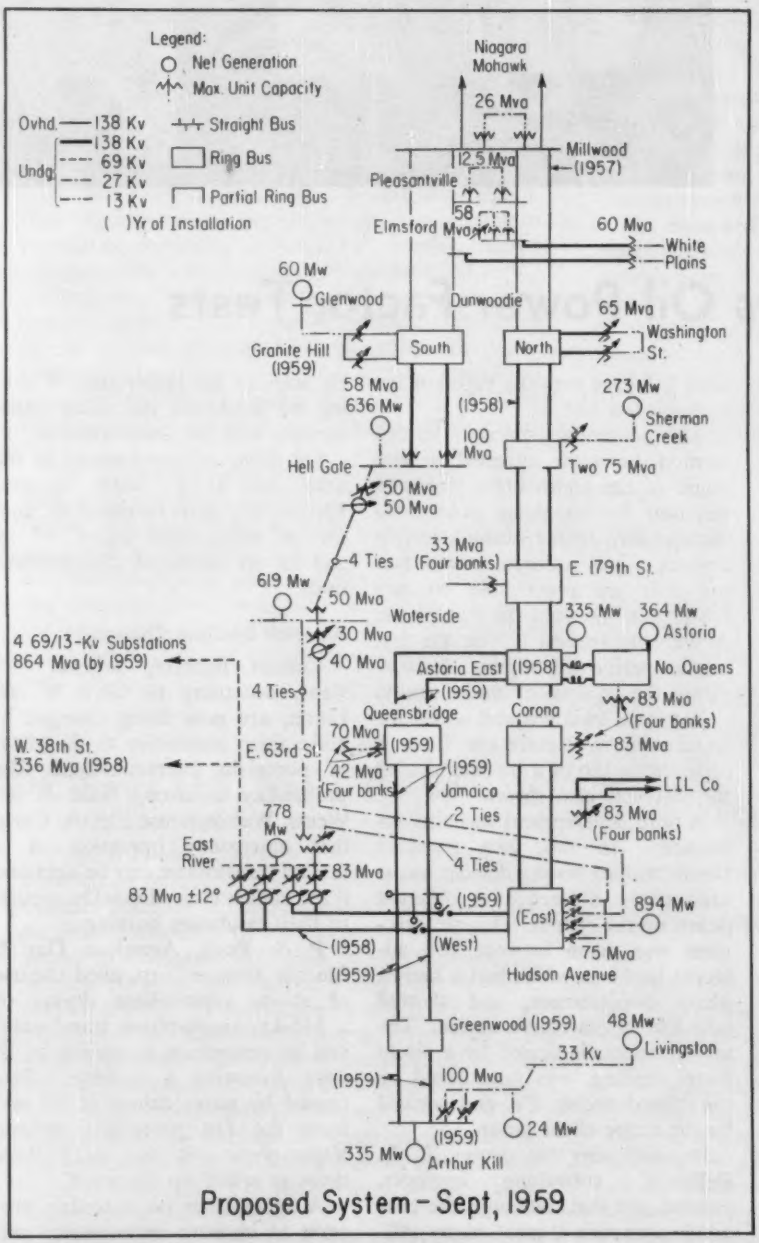
P. S. Pugh, American Gas & Electric Service Corp, cited the use of at-site vapor-phase drying of a 345-kv, single-phase transformer and its restoration to service in 18 days, following a bushing failure caused by water deluge of 10 min from the fire protection system. Vapor-phase oil was used three times to speed up the work.

A symposium on a testing program to improve maintenance was held by representatives of seven utilities.

New Air Breakers for 138 Kv

Con Edison plans based on 138-kv, 10,000-Mva air-blast breakers and 1,000-Mva, 13.8-kv magnetic air breakers

T. D. REIMERS, Inside Plant Engineer, Consolidated Edison Co of New York, Inc, New York, N. Y.



MAJOR STATIONS AND TIES are being added to system to meet 3,750-Mva summer peak expected in 1959. System-tie pattern looks to a 6,000 Mva peak

Development of higher ratings in 138-kv air-blast breakers and 13.8-kv magnetic air breakers provide Consolidated Edison Co with building blocks to meet forecasted system loads. Construction of new substations and major changes at existing stations are based on use of 10,000-Mva interrupting duty 138-kv breakers.

New 1,000-Mva magnetic breakers permit continued use of a large bused 13.8-kv substation. They offer a considerable saving over air-blast breakers previously used. First use of 138-kv air-insulated metal-clad bus permits installation of 138-kv facilities in a limited space and is cheaper than indoor open bus.

This equipment is playing an important part in Con Edison's system expansion to meet a summer peak of 3,750 Mw forecast for next year. Design of new 138-kv substations and switching stations and a flexible system-tie pattern look ahead to system peaks of 6,000 Mw.

15 Breakers Now in Service

For the first time on its system, Con Edison is using 10,000-Mva 138-kv air blast circuit breakers. There are 15 in service at four major substations; some have been in service for a year. More breakers at these four stations and at five others will bring the installed number to 45 in 1959.

Where there are several at a station, the breakers have a common compressed-air supply and storage system. Suitable check and protection valves minimize the possibility of a piping break bleeding the air from the entire station system. Two or more compressors are used, depending upon the number of breakers in a station.

At Jamaica Substation, increased short-circuit duty prompted replacement of 3,500 and 5,000-Mva oil breakers by 10,000-Mva air-blast units. The dead-tank air-blast breakers, having essentially the same dimensions and terminal arrangements, fitted particularly well into the available space there.

East River 138-69-kv tie station marks the first use of 138-kv air-in-

and 13.8 Kv Pace Load Growth

sulated, metalclad bus which enables installation of 138-kv facilities in a very limited space. Load growth in the area supplied by the East River 69-kv bus required support from the 138-kv tie system. For tie facilities, the only space available was the 64 x 160-ft area between 69-27-13-kv tie transformers and the boundary of the area reserved for the station's last large boiler and turbogenerator.

This limited space had to accommodate the termination of four 138-kv underground tie feeders; two 138-kv air circuit breakers; four 50/83.3-Mva, 138-69-kv autotransformers; four 50/83.3-Mva angle regulators; six 69-kv air circuit breakers; six 69-kv cable terminations for two substation feeders and four ties to 69-kv bus sections elsewhere on the property; and necessary 69 and 138-kv bus.

East River has had air-insulated, phase-isolated, metalclad bus for the 69-kv bus sections since 1952, and it has given excellent service. Studies showed that open bus with walls separating each section or phase-isolated metalclad bus was required to obtain adequate working clearance on 138-kv circuits in the space for the new tie facilities. Talks with the manufacturer of the 69-kv bus led to a design of 138-kv air-insulated metalclad bus. Cost estimates indicated the metalclad bus installed outdoors would be cheaper than the open bus in rooms.

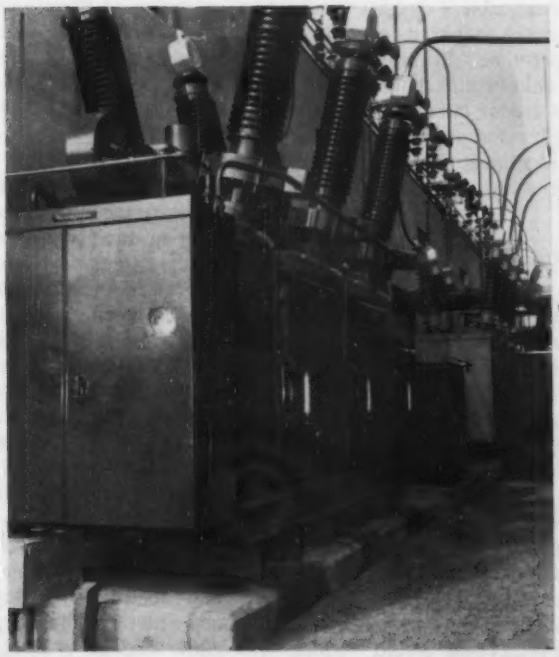
3 Insulators per Support

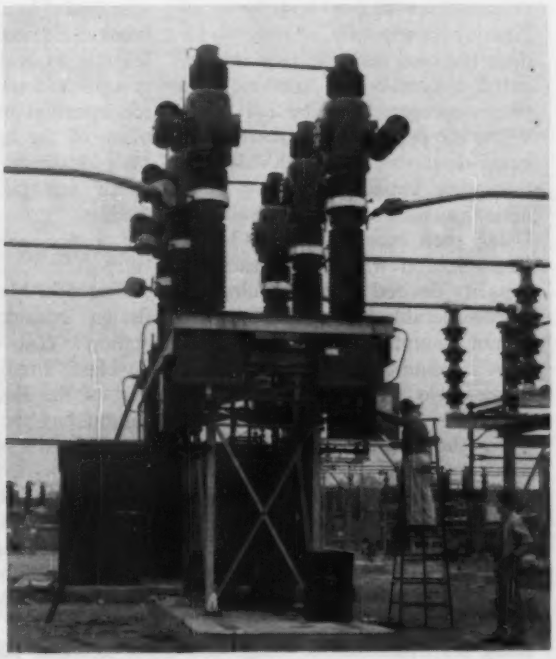
The 138-kv metalclad bus consists of cylindrical aluminum sections, 6 ft 8 in. ID, enclosing 4-in dia copper bus supported by three insulators at each support point. It is covered with 0.3-in. of varnished cambric tape to prevent fault travel and consequent insulator damage. Each disconnect switch consists of a blade withdrawn in a plane parallel to the bus.

Proper stress distribution at disconnect switches, transformer terminals, and cable potheads is obtained by grading rings. All elements of the circuit have withstood the standard 310-kv, 60-cps, 1-min test satisfactorily. Breakdown tests have given values considerably in excess of the withstand value. This 138-kv installation has been in satisfactory service since September 1956.

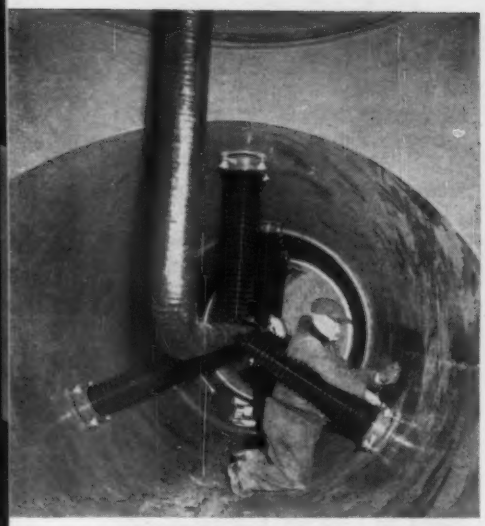
The West 38th Street Substation, designed for a ultimate load of 150 Mw, is located in the sub-basement of 43-story commercial building in New York City's garment district. Load growth in this area and the difficulty of obtaining suitable land at a reasonable price suggested that the sub-basement, leased originally for a 20,000-kw dc substation but never so used, might be used for a large ac substation.

Five 25/33.3-Mva, 69-13.8-kv transformers and four 13.8-kv feeder sections were installed in 1956. Two additional transformers and feeder sections are being installed for service this spring. All equipment had to be lowered through a 7x12-ft sidewalk opening to a level 44 ft below the sidewalk. Switchgear then had to be raised within the building to the 27-ft elevation. Transformer load-tap-





JAMAICA SUBSTATION has dead-tank design 138-kv, 10,000-Mva air-blast breaker (left). It is essentially the same size as the original oil breaker. Corona Substation has a 138-kv, 10,000-Mva unit of different make (right)



METALCLAD 138-KV BUS consists of aluminum sections and 4-in. copper bus

TIE CONNECTIONS at East River Substation use metalclad 138-kv bus to permit installation of 138-kv facilities in a very limited space measuring 64x160 ft

changing equipment, shipped separately, was installed on the unit after the main tank was on its foundation.

Before use of this site, the company's large-area substations, supplying 13-kv feeders to low-voltage network banks, used 1,000-Mva air blast breakers and phase-isolated metalclad bus with the transformer banks solidly bused together. Costs of such substations had been increasing continually. Thus, to reduce the cost, the company investigated magnetic air breakers and phase-segregated metalclad bus. When the design of this station was being developed, only 500-Mva interrupting capacity 13.8-kv magnetic air breakers were available. Using such breakers in a 13.8-kv bused station with the transformer capacity desired would require use of considerable reactance. This use is not compatible with the company's requirements for uniform phase-angle conditions for feeders supplying network banks. Moreover, the space needed and the losses of these reactors would aggravate the problem of utilizing and ventilating the restricted basement space.

A plan was investigated using the 500-Mva interrupting capacity breaker without a 13.8-kv bus paralleling the transformers. Angle conditions between 13-kv sections could be adjusted to a reasonable range. The station would be supplied from the East River 69-kv bus, which has phase-angle regulators on the new 138-69-kv tie banks.

During an outage on a 69-13.8-kv bank or its supply feeder, the 13.8-kv feeders from the de-energized section may each be transferred to an adjacent 13.8-kv section. Metalclad cubicles with standard interchangeable circuit breaker elements make such transfer feasible in a short time. Portable ground and test units are available for insertion in a feeder cubicle in place of the breaker for supplying fault-locating, identification, or proof test facilities to individual feeders.

Magnetic Breakers Cut Cost

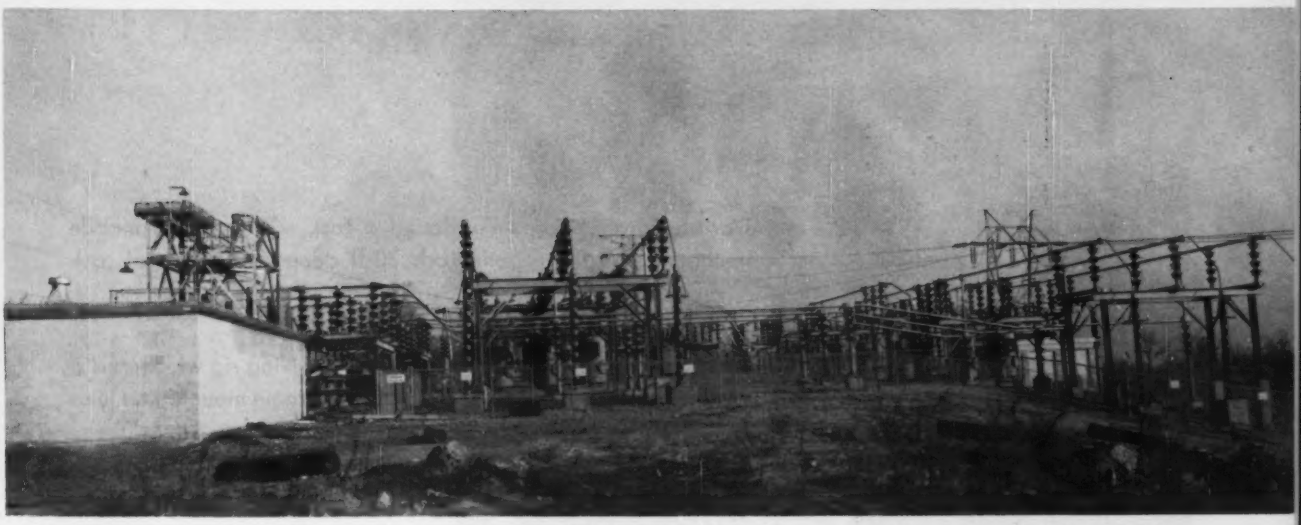
The 500-Mva switchgear in this design considerably reduced the station's cost over a design with air-blast breakers. The 13.8-kv part of the East 179th Street Substation has the same electrical design, but its switchgear is outdoor metalclad.

Originally the non-bused 13.8-kv design was contemplated also for the Leonard Street and East 63rd Street Substations. The newly-available 750-Mva interrupting capacity 13.8-kv magnetic air breakers in metal clad switchgear would permit return to the 13.8-kv bused design, using a slight increase in transformer impedance and load-tap-changer range.

Normally, with all six 25/42-Mva transformer banks in service, each station would be operated in two buses with three banks each. When one transformer bank is out of service, all five banks can be bused solidly. Although slightly higher in total cost than the non-bused 13.8-kv design of West 38th Street, the new design provides about 20% more capacity under contingency conditions, as all banks share the load equally. As a result, the cost per kva is slightly less than for the non-bused design.

The bused substation has operating advantages over the non-bused design, resulting in savings in the network system. Circulating current through network banks and mains is minimized when the 13.8-kv supply comes from a solid bus.

Granite Hill Substation in Westchester County is scheduled for operation in 1959. It will be the first to use 1,000-Mva interrupting capacity, 13.8-kv magnetic air breakers. These are available in 3,000 and 1,200-amp ratings. The higher interrupting capacity will permit a decrease in the transformer impedance and load-tap-changing range. Breakers with the 3,000-amp rating will allow use of a larger transformer. This station, as well as others planned for the early



DUNWOODIE SUBSTATION, expanded in 1955 and 1956, is rearranged for reliability and increased breaker rating. New bus sections are kept to minimum height and follow the contour of the terrain to present a neat appearance

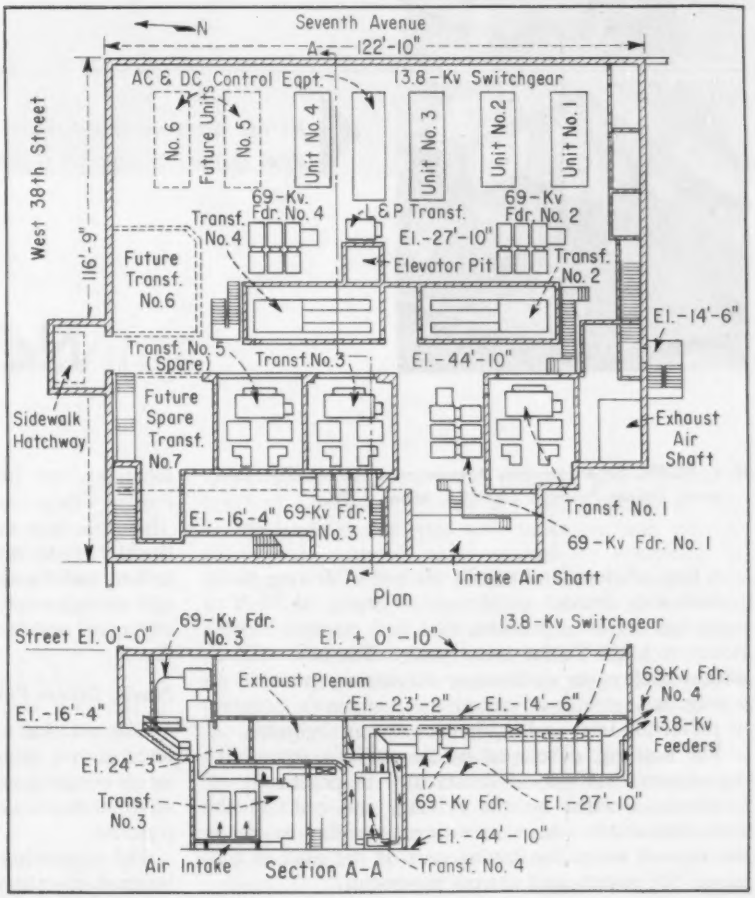
1960's, will be designed for an ultimate of four 35/58.3-Mva. banks.

Granite Hill, like Leonard Street and East 63rd Street, will have outdoor metalclad construction. Circuit breaker removal aisles of adjacent minor sections will face each other. The metalclad cubicle construction will be extended to provide a roof and end walls for the aisle so that breakers can be withdrawn from and ground and test units inserted in the feeder breaker cubicles in any weather. These stations will have phase-segregated bus, the switchgear of each bus section being physically separated by porcelain-wall bushings to prevent the spread of a fault.

Equipment Rearranged

The old 138-kv Dunwoodie Substation was considerably expanded in 1955 and 1956 to provide more circuits. Its equipment was rearranged to afford greater reliability and increased breaker rating. It also was split into two buses with no interconnection, as such separation would be needed to keep within 10,000-Mva breaker duty.

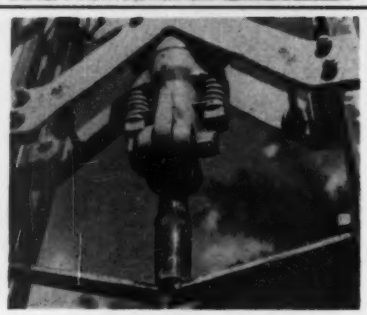
With one side of this station adjacent to a residential area and the other to the New York Thruway, particular care was taken to make it as inconspicuous as possible. Bus heights were kept to a minimum and the land's contour followed.



SUB-BASEMENT LAYOUT for West 38th Street Station provides for 150-Mva ultimate capacity. Use of 500-Mva air breakers reduced cost of the station

Florida Power & Light has found a fast, efficient, and mobile method of driving ground rods 30-ft deep through coral rock

Two-man crew operates this ground-rod-driving rig which uses a 90-lb pneumatic hammer and supporting frame mounted on jeep



As the hammer slides down the frame, it springs back-hinged steel guides a pair at a time. Guides hold the rod in place

New Rig Speeds

H. L. ALLEN, Superintendent, Automotive & Construction Equipment, Florida Power & Light Co, Miami, Fla.

A fast, efficient, and mobile method of driving ⅝-in. ground rods through coral rock to depths of 30 ft or more has solved a problem that had plagued Florida Power & Light Co for many years. The new scheme, which employs an air-hammer driving rig mounted on a jeep, has greatly advanced the company's program of protecting lines and equipment against lightning.

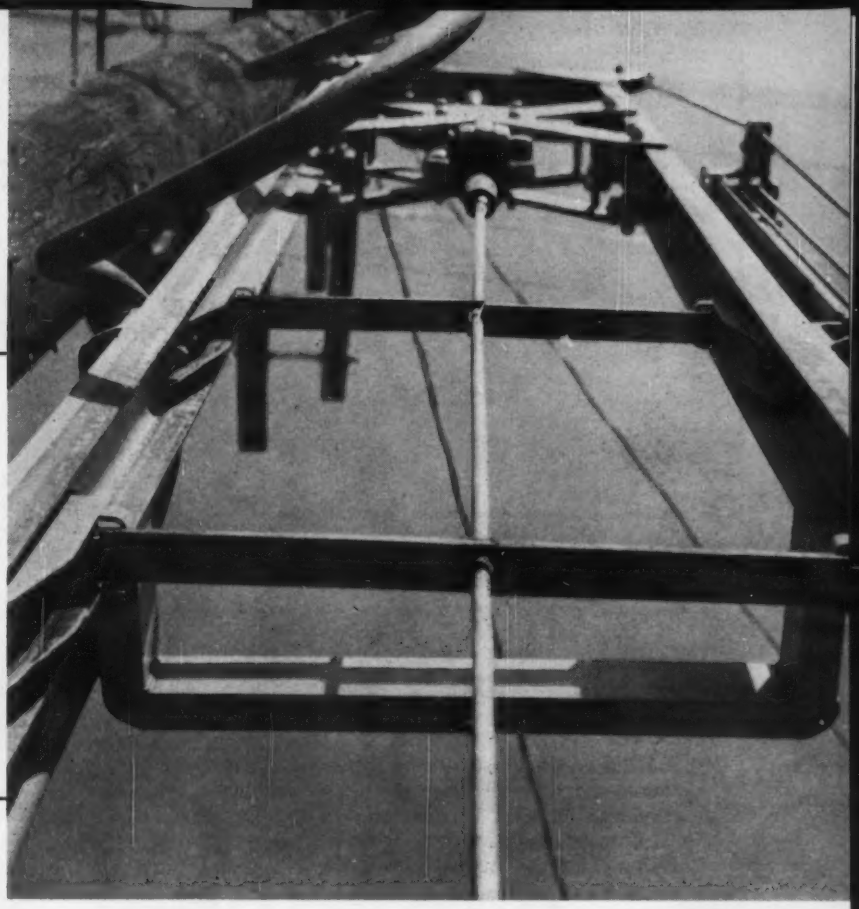
The new rig, developed by the utility's automotive department, has proved satisfactory in practically all locations, speeded up the driving, and reduced the cost substantially. Also, its extreme mobility has made the rig well suited for driving rods off the road as well as on city streets and narrow easements.

In certain areas of the company's territory, underlying coral rock makes it difficult to secure adequate grounds. Six or 8-ft rods can be driven easily at most locations, but the high resistivity of the surface soil renders them ineffective for protecting equipment. Therefore it is necessary to resort to deep-driven sectional rods to reach the better conducting soils. One-half-in and ⅝-in.-diam copper-covered steel rods are stiff enough to penetrate the coral but must be properly supported and steadied above ground level while being driven.

Power Driver Punches Rods Through Coral

The solution to this problem is the driving rig pictured above. It is a pick-up Jeep on which is mounted an air compressor and the framework for supporting an 80 to 90-lb pneumatic hammer of the type used to break concrete.

The supporting framework is made of two C-sections fastened together to form a single rigid unit comprising the guide or track for the hammer. The framework is hinged at the rear of the truck so that it can be lowered to a horizontal travel position over the



Looking up the frame shows the rod held in place as the hammer drives it downward

Photos courtesy Copperweld Steel Co

Ground-Rod Driving

truck body. It is lowered and raised by a double-acting hydraulic cylinder powered from a 7-gpm hydraulic pump belt-driven from the power-take-off shaft. This pump also powers the hammer, which is carried in an X-shaped cradle between the frame work guides.

Compressed air for operating the hammer is supplied by a two-stage compressor, driven from the power-take-off shaft, which delivers 47 cfm to a 30-gal 120-psi air receiver. The hammer uses 65-70 cfm of air, but the capacity of the receiver is sufficient to operate the hammer for only 30 sec before pressure drops to 70 psi, the minimum effective pressure. If the rod cannot be driven in this time, the receiver pressure will build up within 30 sec to 120 psi.

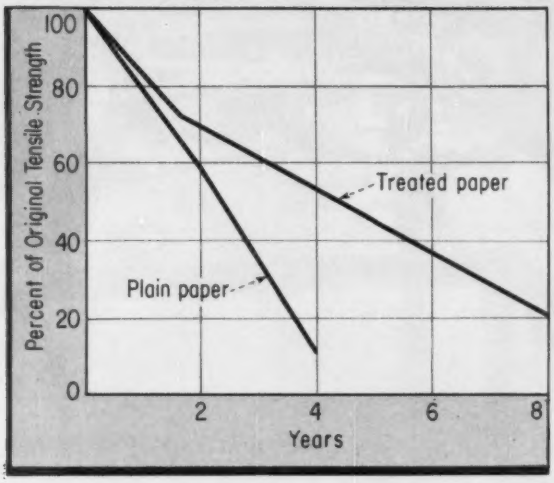
Guides Keep Ground Rod Straight

An important feature that contributed to the success of the rig is the four guides used to support and steady the ground rod. Hinged with springs to the inside of the framework, the guides are pushed down and out of the way by the hammer. They are easily raised to horizontal position around the rod prior to driving.

The truck is equipped with racks on both sides to carry 100 sectional rods, as well as equipment to facilitate installation of couplings and driving heads.

The first driving rig proved so successful that four more have been built. Three are used in Dade County for grounding new transformer pole installations, and for checking and improving existing grounds at trouble spots. The other two rigs are used system-wide for grounding new transmission structures.

The driving crew, consisting of a lineman and a helper, has driven on new construction as many as 200 rod sections in an 8-hr day. The crew uses a ground-resistance tester to measure resistance after each rod section is driven. An average of three 10-ft sections is required for most grounds, but at some locations it is necessary to drive deeper or to install several deep grounds and connect them in multiple to obtain the desired low resistance.



Paper Additive Betters Insulation

Inhibits component's deterioration, thus permitting combination that raises life, thermal limit of distribution transformer

STABILIZED PAPER resists tensile strength degradation at 115C hot spot in a sealed distribution transformer

J. G. FORD, M. G. LEONARD, Transformer Division, Sharon,

J. SWISS, Research Laboratories, Pittsburgh,

G. C. GAINER, Materials Engineering Dept, Pittsburgh, Pa., Westinghouse Electric Corp

Addition of an amine stabilizing compound inhibits the deterioration of paper used in the insulation of distribution transformers. Paper so treated lasts longer at a transformer's operating temperatures and contributes to its useful span of life. It also tolerates operation at higher temperatures during overloads.

This inhibitor may be added directly to the paper. Its successful application hinged upon development of a new synthetic wire enamel which could resist the deleterious effects of amine and cellulose combinations.

Enamel Resists Inhibitor

Tests in hot oil proved that a newly developed synthetic enamel could resist the stabilizing inhibitor where a conventional polyester-amide compound failed. This finding enabled use of the new treated paper in conjunction with previously improved insulating oil in a new balanced insulation system called Insuldur.

Study of the effects of temperature and time on the mechanical and electrical strengths of cellulose began about a decade ago. Amines were used to stabilize the cellulose, thus inhibiting paper degradation.

More recent tests were made of different methods of preserving oil and cellulosic insulations, including paper and pressboard, at 100 to 150C in 15 power transformers scaled to about the size of 10-kva distribution units. These indicate that after four years the amine-treated paper is about four times as strong as the untreated.

Other tests on insulation at 225 to 250C, under oil and in the presence of magnetic steel and bare copper to simulate the conditions of chemical interaction possible in a transformer, showed a distinct, yet less impressive, advantage for the treated paper. These tests showed that the untreated paper maintained some advantages up to 250C.

Based on all these data, the new material was used for building a sample 5-kva distribution transformer for confirmation. Another unit was built exactly the same except with conventional insulation.

Loading these units back-to-back for aging one week (168 hr) at 265% load and 140C continuous average copper temperature revealed an improvement in layer material consistent with earlier data. But the chemical action that stabilized the paper affected the polyester-amide wire enamel adversely. The combination was not acceptable for commercial use.

Many other enamels were investigated, three types being tested for electrical strength after prolonged exposure to 150C oil in loosely capped jars with paper samples present. Results showed a distinct superiority for a new synthetic enamel. Tests in the presence of the new amine-treated paper confirmed this superiority.

Scale transformer models with core, coil, and liquid dielectric enclosed in a sealed steel container were then assembled with various combinations of materials. Tests were run for one week at 140C, simulating the previous transformer tests. More than 50 combinations of materials were tried out on this basis. These tests confirmed that the best combination was the new synthetic enamel, both thermally and hydrolytically stable, with a paper treated with an amine additive.

The final test used actual transformers. Samples of 5-kva, 2,400-v design were made, some with the old insulation and others with the new. The week-long test at 140C was repeated with satisfactory results.

Improves Thermal Performance

The added amine compound inhibits paper deterioration without adversely affecting the wire enamel. The enamel itself must withstand hydrolytic action. This characteristic of the newly developed enamel explains why it is preferred to the older one. Above 150C the stabilizing compound becomes less effective, although it retains some tendency to inhibit paper degradation.

And in this temperature range, the stability of the synthetic wire enamel assumes its real importance; for it is there that its overall effect is improvement of the transformer's thermal performance.

METER ACCURACY PROTECTED

by quality socket

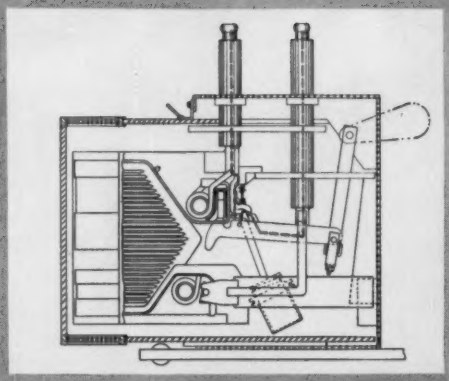
Today's improved meters demand a mounting that will help sustain high accuracy and help protect meter life over a period of 30 years or more. No matter how accurate the meter—a poor quality socket can mean less dependability . . . meter failures and lost revenue.

To help meter men protect today's quality meters with a genuine quality mounting, General Electric designed the rugged S-1 Square Meter Socket. It's designed specifically to help protect meter performance over the life span of the meter it serves. Made of strong, lightweight, die-cast aluminum, the S-1 is easy to install. It has external hubs, large inside working space, lay-in type terminals requiring only 45-degree wire bend. You get true versatility from the S-1 since it comes with two, one, or no hubs, pre-scored positive knockouts and it can be mounted either vertically or horizontally by simply interchanging terminals 90 degrees.

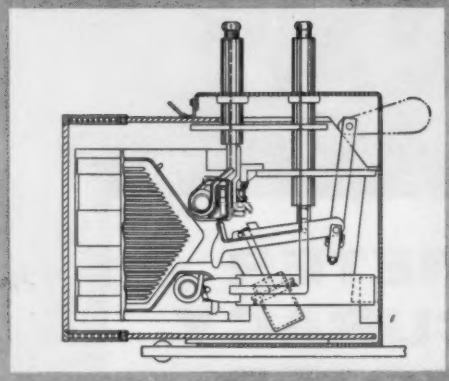
You get safety protection with a choice of lay-in bus-type or serrated strap terminals—both with positive ground. For the life of a meter, the rugged, weather-tight construction of the S-1 gives solid protection from severe weather conditions. The long-life dependability of this versatile 100-amp capacity socket provides real protection for your investment in meter accuracy. Ask your General Electric Apparatus salesman—he'll be glad to show you the facts, or write to General Electric Company, Section 628-1, Schenectady 5, N. Y.

Progress Is Our Most Important Product

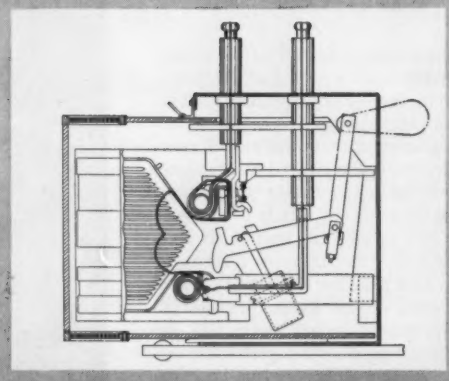
GENERAL ELECTRIC



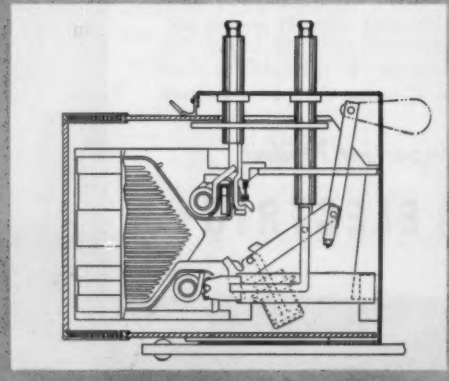
½ At approximately ½ cycle, breaker is closed. Red line shows current path through contacts.



1 At one cycle, breaker is operating. Contacts have parted, arc is drawn.



1½ At one and one-half cycles, arc has been forced into arc chute for interruption.



2 At two cycles, arc has been extinguished, and complete circuit interruption has occurred.

INTERRUPTS FAULTS IN ONLY 2 CYCLES

General Electric Announces Industry's First 2-cycle, 13.8-kv Metal-clad

Fault interruption in only two cycles is now possible with General Electric's new line of 13.8-kv Metal-clad Switchgear.

This new 2-cycle equipment is specifically designed to meet electric utilities' need for faster interruption and increased system protection.

Electric utilities using General Electric's new 2-cycle, 13.8-kv breaker can get:

- reduced line burning
- better protection against conductor annealing during faults, and
- better co-ordination with other distribution protective devices.

These same benefits are also provided by new companion 2-cycle, 4.16-kv Metal-clad Switchgear.

Contact your nearest G-E Apparatus Sales Office for more information on the new line of 2-cycle circuit breakers. General Electric Co., Schenectady, New York.

511-30

Progress Is Our Most Important Product

GENERAL ELECTRIC

Graded Arrester Gap Design Solves Contamination Problem

W. H. EASON, Supervisor, Line and Station Arrester, Product Engineering

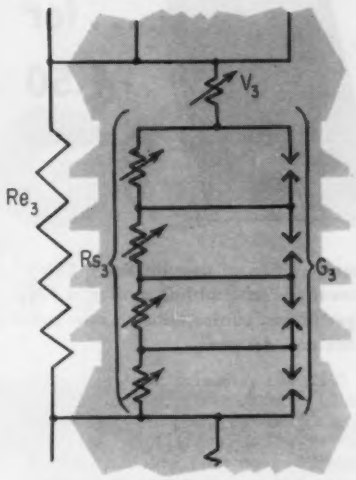
T. J. CARPENTER, Development Engineer-Lightning Arresters, Distribution Transformer Department, General Electric Co, Pittsfield, Mass.

An improved graded gap in station-type lightning arresters has been designed to solve the problem of porcelain contamination. Developed after detailed study of the failure mechanism, the gap restores voltage uniformly and automatically as required for reliable operation.

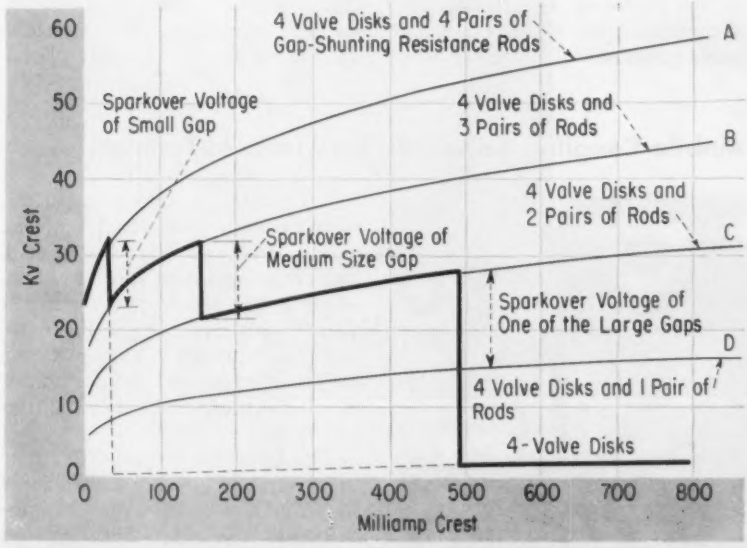
This problem arises when foreign materials in the atmosphere—such as fly ash, salt fog, chemical dust—settle on insulating surfaces and form a contaminating layer. Usually non-conducting when dry, most contaminants become highly conducting when wet. Heavy rains wash the contaminant away, but light rains or heavy fog can precipitate the problem.

The series gaps in each unit are set with varying spacing—one small, one medium, and two large settings. When the stack voltage distribution is upset by contamination only one of the four gaps in the most highly stressed unit sparks over. This leaves three gaps with their shunting resistors in the circuit. This moderate reduction in unit resistance tends to restore uniform voltage distribution along the stack. More severe contamination may cause two of the four gaps to spark over but complete sparkover of the unit due to contamination upset is avoided.

The operation of this new gap can be seen in the volt-amp characteristic of a 12-kv unit (below). This diagram shows how the series arrangement of the very low resistance valve discs and higher resistance gap-shunting resistors add to give the proper characteristic.



FOUR SERIES GAPS set with different spacings control unit voltage. Re_3 is external leakage of third unit in stack; V_3, valve elements; Rs_3, gap-shunting resistors; G_3, represents the gaps.



VOLT-AMP CHARACTERISTIC CURVE shows how the gaps spark over at varying values of leakage current to prevent external flashover of the whole unit

As voltage increases across the driest unit of a stack, current through its gap-shunting resistors increases along Curve A. Voltage is almost equally divided among the four gaps because the resistors are carefully matched. The sparkover voltage of the smallest gap setting is reached when current through the resistors reaches about 40 milliamp. When this gap sparks over, the unit's voltage-current characteristic becomes that of Curve B, more nearly matching others in the stack, and its voltage drops below the sparkover value.

If the voltage on the arrester unit rises again to about 30-kv crest, with the first gap conducting, the medium-spaced gap sparks over, leaving half the original shunting resistance in the circuit. About 160 crest milliamp would be flowing, and, as the units are in series, this current plus any in the unit's contamination layer would also be flowing through or over the other units. When external leakage current reaches 50-150 milliamp rms, complete external flashover is imminent, regardless of whether the porcelain

(*Continued on page* 84)

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CORPORATION

Graded Gap Design

(*Continued from page* 83)

is a single piece or several in series.

Complete sparkover of the main gaps does not occur until about 500 crest milliamp is flowing through the external contaminating layer of the stack. This condition could scarcely exist, however, because station porcelain so badly contaminated would long since have required cleaning. Thus the safety factor appears adequate.

This design grew out of laboratory tests of a conventional eight-unit 97-kv station-type arrester. Very high resistance dividers were used with the oscillograph elements to minimize their influence on voltage distribution.

The complete arrester was thoroughly wetted with a highly conducting 10% salt solution and energized at 70 kv, the normal line-to-neutral value. Initially, the current measured by meter "A" fluctuated widely around 100 milliamp. There was intermittent sparking on the surface of some units, and voltage distribution fluctuated rapidly. Values varied between 1 and 14 kv across the bottom 12-kv unit and between 4 and 32 kv across the second and third units together. This contrasted with uniform voltage distribution when dry.

The resistance of the external contaminating layer (R_e) depends on the degree of wetness and contamination. Its resistance ranges from thousands of megohms when dry to less than 0.1 megohm when severely contaminated and thoroughly wet. When this contamination becomes wet and begins to dry, the sequence of events for a conventional stacked arrester might be:

1. Initially, voltage distribution is normal.

2. As drying progresses, one unit (assume No. 3) recovers resistance of its contaminating layer, Re_3, slightly faster than the others. Continued current flow causes heating which accelerates drying, further increasing the resistance.

3. As Re_3 increases in resistance, the voltage across the unit exceeds its share of stack voltage.

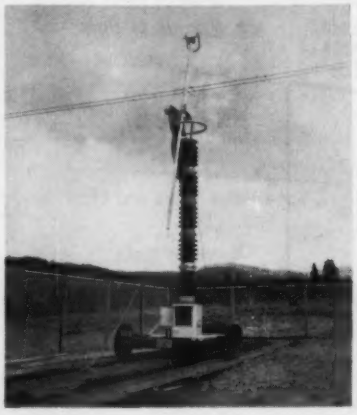
4. Gap-shunting resistor Rs_3 becomes the controlling resistance as Re_3 becomes higher in resistance than Rs_3. Excessive contamination may pass so much current that the voltage across Rs_3 flashes gap G_3.

5. When G_3 sparks over, the unit is essentially shorted out, except for the negligible resistance of V_3. The procedure is then repeated at an accelerated rate with stack voltage divided among seven units.

6. Meanwhile the contaminated layers on all units are drying. If the surfaces of all units dry out sufficiently to restore good voltage distribution before the stack sparks over completely at normal power voltage, the arrester remains in service. But complete failure of the arrester can result under critical weather conditions.

The improved gap is designed to interrupt this sequence of events, thereby immunizing the arresters against contamination failure.

Mobile Coupling Capacitor Facilitates RI Testing



A 330-kv coupling capacitor mounted on a three-wheel platform permits easy checking of generated radio interference on various phases of the several test lines at the Leadville (Colo.) high-voltage, high-altitude test project. The platform moves in three steel-channel tracks which run transversely under all the test lines.

The Leadville project (EW, Jan. 20, p 51), conceived by Public Service Co of Colorado, is aimed at developing basic knowledge on the operation of extra-high-voltage lines at high altitudes.

when weather's rough and time short . . .

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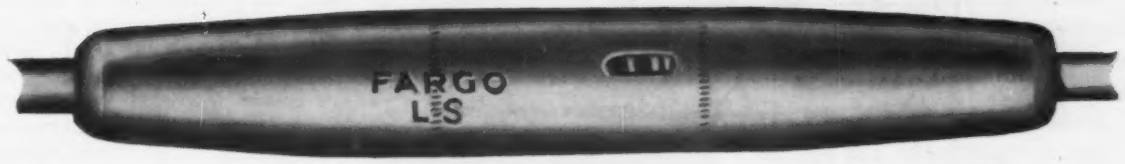

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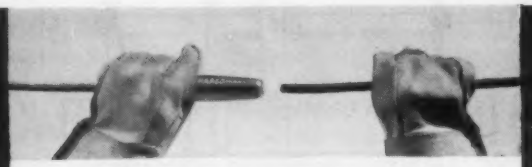
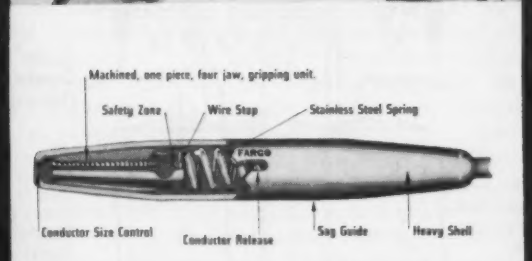
EVERY TIME!





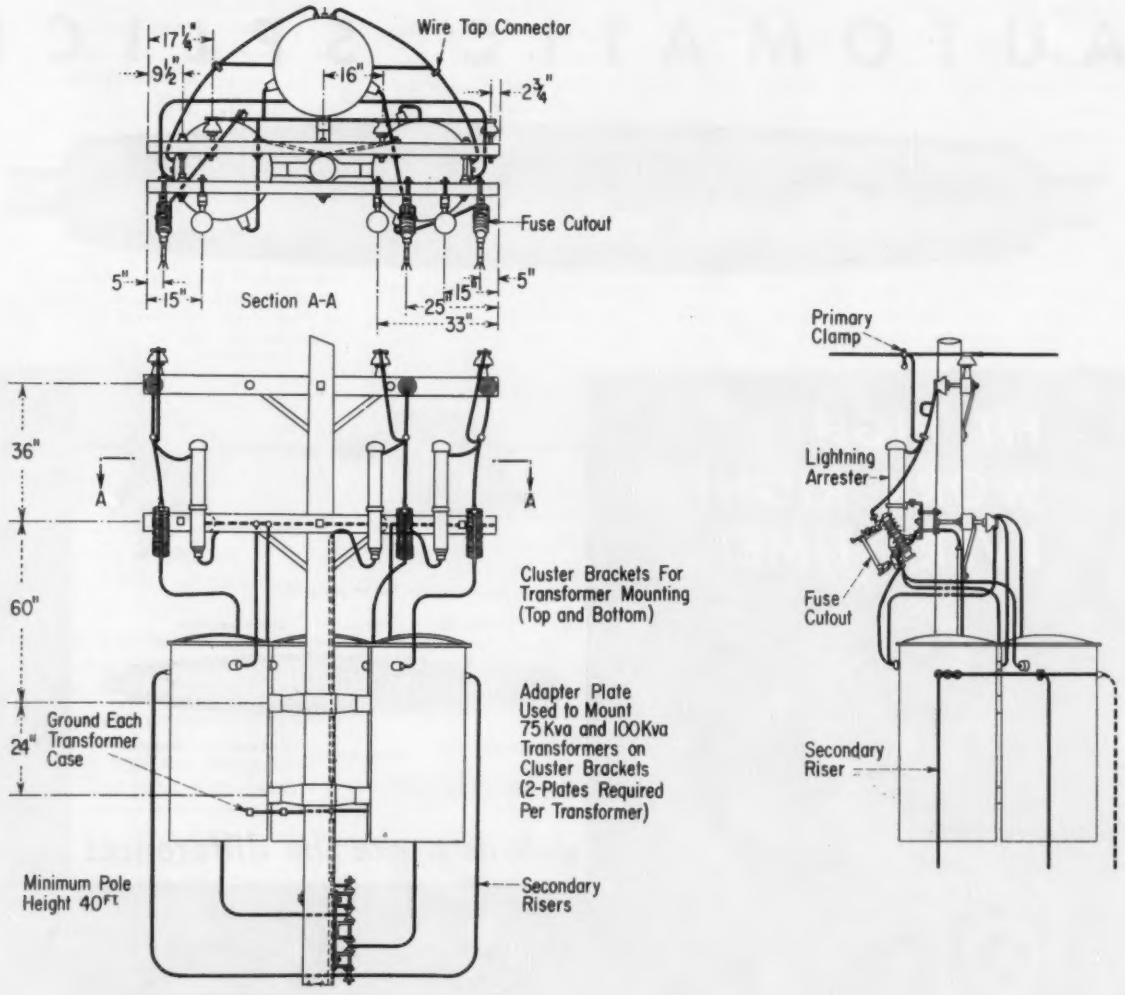
details make the difference!

LM

FARGO

Transformer Cluster Mounted on Poles—11*

Sidewall-bushing type transformers can be installed in a cluster on a pole and connected as shown in these outlines. The arrangement is designed for single-phase transformers having capacities in the range of 37.5 through 100 kva, with 4,160-v, 8,320-v or 12,470-v primaries wye-connected on 3-phase circuits and supplying 240/120-v, three-phase circuits. This method is an adaptation from Distribution Specifications prepared and used by West Penn Power Co.



*Similar data for cluster mounting of cover-bushing type transformers were presented in Electrical World, February 10, 1958, p 66

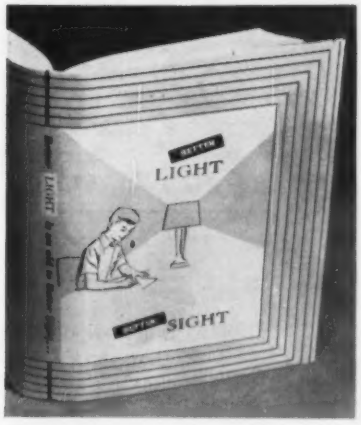
BLBS' 3-Pronged Drive

Book covers, work with optometrists, and teaching aids spearhead utility activities

Better Light Better Sight Bureau has been going after more utility cooperation. Results of three recent bureau activities show it's getting it.

Book covers for use by school children, which promote good lighting, have been produced by the Bureau. They carry a brief message about lighting in the home and were designed for local distribution by utilities to supplement other lighting promotions. Walter G. McKie, general sales manager, Rochester Gas & Electric Corp, and chairman of the BLBS Bureau, reports that initial testing by several companies indicates that the covers are very acceptable to school authorities.

Cooperation between utilities and optometrists was urged by Robert L. Coe, residential sales manager,



Union Electric Co, St. Louis, Mo., in a speech before the Public Relations Roundtable of the American Optometric Association. To show that this can be effective he cited three examples of what utilities are doing to further good lighting.

Pacific Gas & Electric Co has received an award from the California Optometric Association for its campaign urging proper eye care and the use of good lighting. The campaign slogan, "Only 2 to a customer" was vigorously promoted through posters, billboards and a mailing program.

Union Electric's Coe

In Rochester every year, Rochester Gas & Electric Co takes part in a Sight Saving Month activity which is conducted by the local Tuberculosis and Health Association. This campaign involves cooperation between the utility, representing the lighting interests, and the optometrists, ophthomalogists, optical manufacturers and school authorities. Posters, displays, essay contests, and other community activities focus attention on eye care and the proper use of light.

A Bureau folder, "Light An Aid to Sight" proved very effective during last year's "Save Your Vision Week." Union Electric submitted a copy to the American Optometric Association headquarters and the Association decided to include a copy in each Save Your Vision Week kit. A Rhode Island utility executive later reported that an optometrist in his area said to him, "This booklet was enclosed in our Save Your Vision Week kit. How can I get more of them?" The utility secured copies from the BLBS Bureau and the optometrists in the area distributed them to their customers.

In closing, Coe told the optometrists, "We can tell your story and you can tell ours. We have some literature and other materials which you may find useful locally—either as a part of a specific campaign or activity or as a part of a continuing program. On the other hand, there are other things you do that can help us and we should know about."

A Cooperative Teaching Aid Plan enlisted the aid of 71 utilities in the first month of operation. The program is designed to widen the use of light-sight teaching aids, under the sponsorship of local utilities, yet minimize time and labor demands on utilities by providing direct distribution from the BLBS Bureau to teachers.

Here's how it works: Ads in magazines for school teachers reach four fields: fifth and sixth grades; junior high school science classes; home economics classes for grades 9-12; and industrial arts groups. Teachers are invited to send for free teaching aids which teach "the facts of light." The cost of materials is underwritten by the local utility, with the Bureau handling the packing and mailing charges. Utilities may participate on an unlimited cash basis, or may budget a certain amount for the program. If there is no "sponsor" in a certain area the teachers can purchase the materials, or they will be notified if a sponsor should be enrolled in the future.

(*More Selling on page* 88)

WRIGHT SAFEWAYS
Your Best Buy for Rigging and Maintenance Work
12 Sizes
½-ton to 50 tons
Bulletin 412A gives complete details on the many outstanding features that make Wright Safeways your best buy for long, trouble-free life. Write York, Pa. for your copy.
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Load Chain is finest alloy, every foot proof-tested... heat treated for hard wear-resistant working surface... ductile to withstand shock loads... "wick" lubricated... anti-rust zinc coat.
Load and Idler Sheaves rotate on life-lubricated, antifriction bearings... minimum of 5 pockets in Big Sheaves for efficiency and long life.
Gears, Pinions, Drive Spindle (also top and bottom Hooks) are nickel-chrome-molybdenum alloy steel mounted on heavy-duty, antifriction bearings. Gear Train is enclosed in oil-tight chamber.
Load Brake is Weston type, silent, dependable.
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Church Puts Electric Heat . . .

. . . in its new building additions. It realizes savings as well as benefits such as comfort, cleanliness and convenience

The University Park Church in Indianapolis, Ind., is expanding its facilities by adding a recreation room, office, and adult section. The oil heating system for the original church and buildings does not have sufficient capacity to take care of the requirements of the new facilities. To have increased this capacity to the necessary amount would have cost $20,000, according to estimates by engineers. The solution seemed obvious: Electric heating.

Some 130 kw of resistance heating is going into the new additions. Its cost is approximately $18,000, permitting an installation-cost saving of $2,000. Breakdown on this cost is as follows:

- Heating units and wiring—$6,000
- Insulation—$7,000
- Air conditioning—$5,000

Regarding operating costs, the picture looks something like this . . .

If oil had been used, fuel costs per year would run an estimated $1,500. The estimated cost of electricity is $2,500. However, when depreciation, maintenance, and interest on the difference in investment costs are considered, the estimated difference runs only $180 a year. Aside from the added comfort, convenience and cleanliness of the electric heating, which, it is felt, more than offsets the small cost differential, there is yet another important saving: some 304 sq ft of floor space is gained by eliminating an oil heating plant. This space is valued at $15 a sq ft, for a total of $4,560.

Estimated Annual Cost Comparison

Oil Heating		Electric Heating	
Fuel cost	$1,500	Energy cost	$2,500
Depreciation	670	Replacement cost (Per yr for 25 yrs)	250
Maintenance	400	Maintenance	50
Interest on $2,000 (Differential in investment costs)	50		
	$2,620		$2,800

NEMA Enlarges Fan Contest

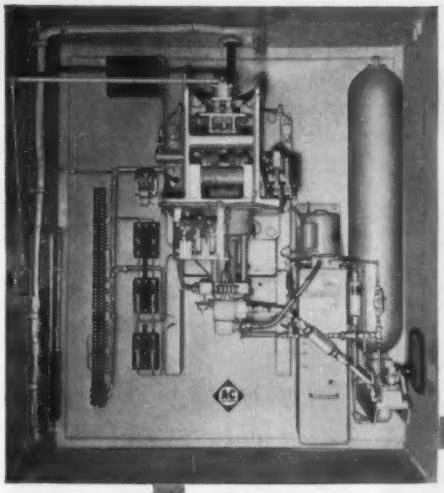
In-store displays of electric fans are now eligible for awards in the Electric Fan Display Contest of NEMA's Electric Fan Section.

A new theme, "Summer's Coming—Buy Fans Now!" and a lengthened contest period, April 15-June 15, are other features of the contest open to anyone who sells or displays electric fans. Entries should be in the form of a photograph of the fan display, either window or in-store and using the specially prepared display pennant.

Items prepared to help retailers include display pennants, a plan booklet for dealers, a fan manual, letterheads, and a consumer folder.

Send photographs to: Fan Display Contest, National Electrical Manufacturers Association, 155 E. 44th St., New York 17, N. Y.

(*More Selling on page* 90)



High-speed Pneu-Draulic operator gains overwhelming user confidence

Seldom does a drastic change in product create such universal user acceptance as the *Pneu-Draulic* operator during the past three years. Fully 98 percent of Allis-Chalmers breaker customers now specify *Pneu-Draulic* operators.

How solid is their confidence? More than half have placed repeat orders! They've proved to themselves that this high-speed closing device, plus *Ruptor* interruption and mechanically trip-free operation, is the right combination for safe, dependable breaker performance.

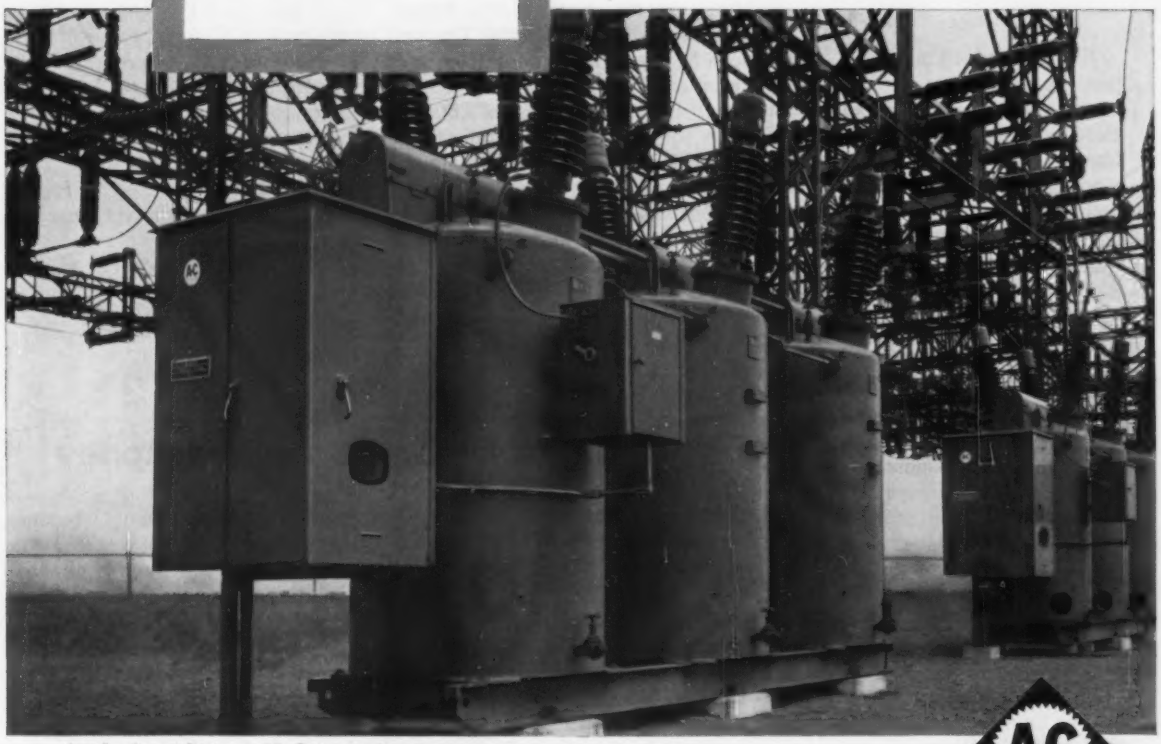
You'll be convinced, too. Call your nearby A-C office or write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wisconsin.

98% acceptance!

Why a Pneu-Draulic System?

- Compact design with few moving parts.
- *Pneu-Draulic* system filled with oil, eliminating rust, freezing, corrosion.
- Safe emergency closing at full rated speed onto energized line, even when no control power is available.
- Complete system protection with mechanically trip-free operator mechanism.

For outdoor oil circuit breakers rated 14.4 kv, 500 mva and larger.



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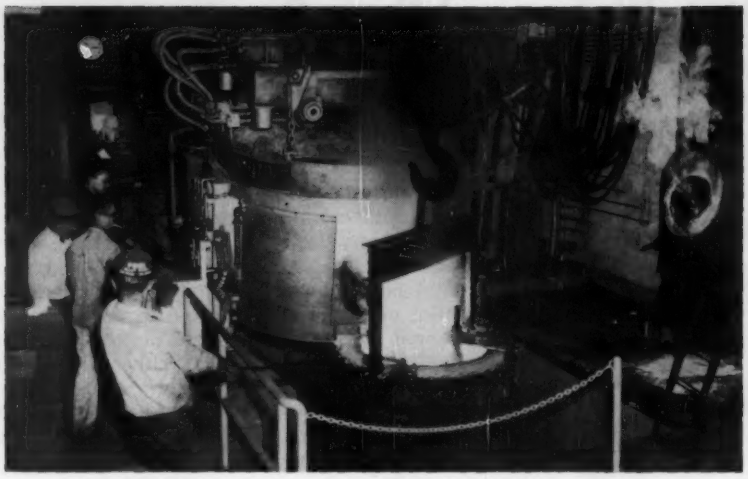
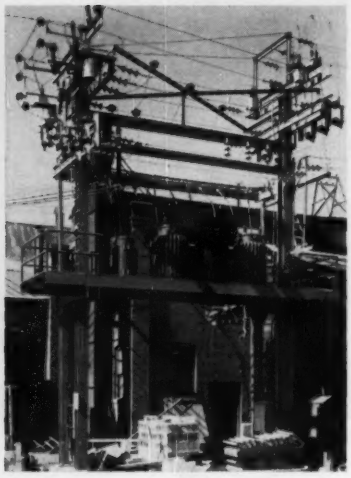


Replacing oil-fired unit with electric arc furnace and . . .



adding 13-kv substation . . .

Electrification Speeds Foundry Production

WILBUR L. KING, Industrial Engineer, Washington Water Power Co, Spokane, Washington

Faster production and a better product are the two big advantages in the Union Iron Works recent electrification of their 60-year old foundry in Spokane, Washington. And the company management says preliminary checks show cost savings beyond expectations. The modernization added a 1,500-kw electric arc furnace and about 800 hp new connected motor load to Union's total load.

First the production-limiting, oil-fired, coke-limestone converter was replaced with a 6-ton Whiting electric furnace. An automatic weight car and a completely automatic sand handling and conditioning system were added. Modern molding machines, shop blaster, core ovens, and a car bottom heat treating furnace round out the automation program. After the building is cleaned and decorated, a modern mercury vapor lighting will be installed in an additional step toward making the foundry one of the most modern in the West.

The new arc furnace can turn out six tons of metal every 40 minutes. This rate is approximately five times as fast as the previous oil-fired unit. A top temperature of 3,200 F and the ease of test sampling assures more highly refined metals and a finer grain. The unit can be used for anything from grey iron castings to the finest quality steel, in sizes from ½ to 7,000 lb. It is equipped with hydraulic tilting controls and electronic-hydraulic current controls.

The sand handling and conditioning system, also electronically controlled, can deliver 30 tons per hr. The sand is automatically weighed and conveyed to the molding machines. Magnetic belts separate metal particles from the used sand before it returns to storage.

A new 13.8-kv steel substation was built to handle the increased load. In addition to supporting the transformers for the 650-hp foundry motor load, the structure accommodates disconnects and metering plus oil switches for the primary feeders to the furnace transformer and load centers in the machine shop and fabricating plant.

The total plant power factor holds at about 85% with little capacitor correction.

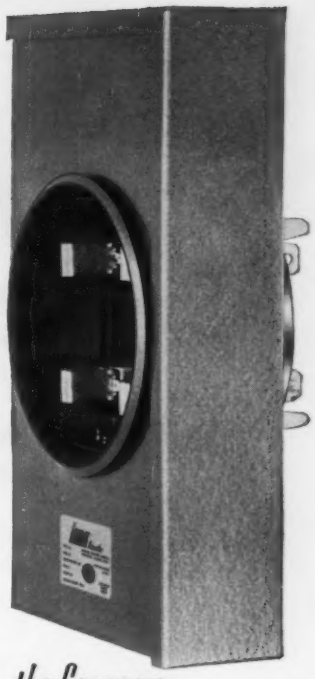
Engineer's Savvy Saves Bottler Money

CLYDE OBERHOLZER, Power Sales Engineer, Pennsylvania Power & Light Co, New Bethlehem, Pa.

A timely piece of sound advice tipped the scales to electric power when the Diamond Springs Water Co, Ephrata, Pa. bottlers of drinking water, decided to install a pump to load tank trucks from one of their springs. Although the company had a 3-phase 5-hp pump available, they planned to use a gasoline engine pump because 3-phase power was not readily available. When it was pointed out that a phase changer could be used to convert the single-phase supply, a cost comparison was made. It showed that the lower cost of electric power plus the reduction in starting time would pay for the changer in less than one year. Results: plans for the gasoline engine pump were cancelled and the operation is now electric.

NEW... 2 kvar SECONDARY CAPACITOR

provides low cost vars at point of *greatest system benefit*



the Sangamo Secovar Capacitor

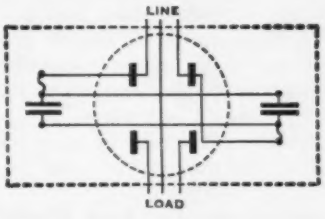
Here's the answer to utilities looking for a more economical 240 volt secondary power capacitor. The Sangamo Secovar Capacitor installs right at the meter box to relieve the var load all down the line, to cut installation costs, and to conserve valuable pole space.

Installation is simple. No wiring changes are necessary. No special equipment is needed . . . one man can make the installation in a matter of minutes.

TYPE S for socket mounting

Combines a secondary power capacitor with a convenient socket mounting adapter. Mounts on a standard meter base—either vertically or horizontally. It contains two capacitor sections, each protected against line or ground faults. Available in 2 kvar, 240 volt rating.

WIRING DIAGRAM



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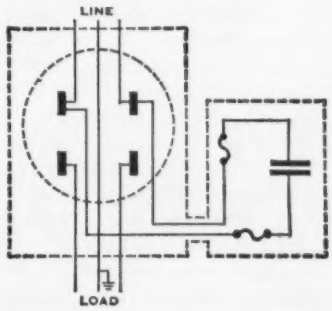


TYPE N for adjacent mounting

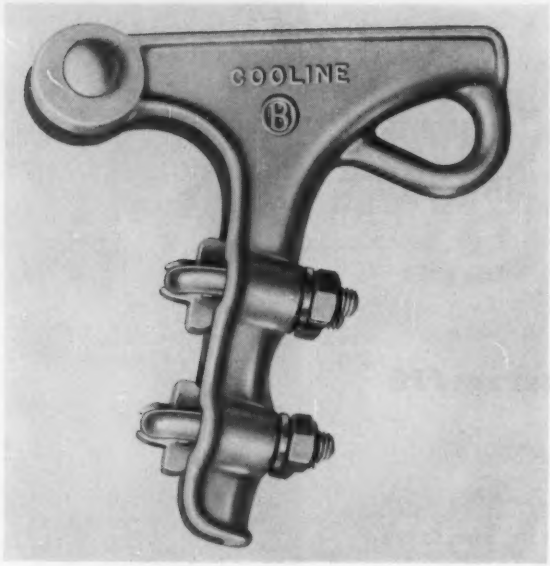
Comes in a metal enclosure with an adjustable mounting bracket and a nipple connection for installation with standard indoor or outdoor service entrance equipment. Protected against either line or ground faults. Available in 1 kvar, 240 volt rating.

FC58-1

SANGAMO ELECTRIC COMPANY

SPRINGFIELD, ILLINOIS

New Equipment



Aluminum Quadrant Clamp . . .

. . . for distribution or station deadends is lighter, can be installed faster than OB transmission clamps. Designated Cooline L-W series, it eliminates cutting or splicing conductors and lends itself to convenient dead-end jumper loops. Gentle snubbing make it suitable for AAAC and all-aluminum as well as ACSR.

Of the six sizes available, five have two ½-in. U-bolts and accept conductors with 0.2 to 1-in. diam. Ultimate strengths range from 7,000 to 18,000 lb. The sixth clamp has three ⅝-in. U-bolts, takes 0.75 to 1.3 in. conductors, and has 25,000-lb ultimate strength.

Ohio Brass Co, Mansfield, Ohio

D-C Current Transducer . . .

. . . measures current from 500 to 500,000 amp with accuracy of 0.5 to 1%. Slipover unit needs no direct electrical connection. A-c current transformer, comprising two saturable reactors which are magnetically coupled to d-c bus, produces a-c signal that is linearly proportional to d-c in bus. Isolation transformer supplies separate excitation voltage to secondary. A-c in secondary is rectified by selenium rectifier and indicated on panel meter. Data sheets TDC-1.

Rapid Electric Co, 2881 Middletown Rd, New York 61, N. Y.

One-Man Trencher . . .

. . . digs a trench 2¾ in. wide, up to 20 in. deep. At the maximum depth, speed of Trench-Devil Model Jr. averages 6 fpm; at 12 in. depth, 15 fpm. It can be used in cable installations and similar light trenching jobs. It has high carbon cutters of heat treated steel, sealed ball bearings and protective shroud.

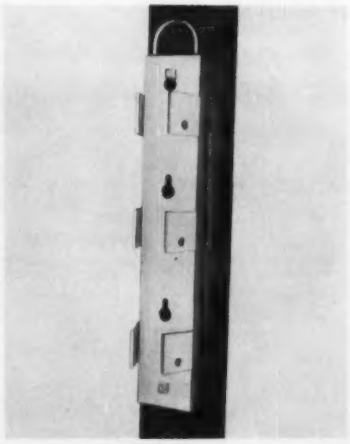
Arps Corp, New Holstein, Wisconsin

Computer Translator . . .

. . . permits rapid interchange of data between different types of electronic computers and data processing equipments. Magnetic tapes recorded in format of one computer can be translated recorded on another tape which is directly usable in a second type of computer. Punched cards or punched paper tape can be converted to magnetic tape. Data on magnetic tapes can be converted to punched card, paper tape, or line printer.

Equipment is designed on building block principle to permit use under variety of different requirements. Designated Model ZA-100, it has internal parity checking, marginal checking, and error control features incorporated throughout the system.

Electronic Engineering Co of California, 1601 E. Chestnut, Santa Ana, Cal.



Dual-Mounting Bracket . . .

. . . simplifies single-phase transformer banking. It can accommodate two transformers, each rated from 3 to 50 kva. Light, sturdy unit has all-welded construction.

Complete assembly of bracket and transformers may be erected simultaneously. Keyhole bolts permit mounting on prepositioned through bolts. Transformer mounting holes have standard EEI-NEMA spacing. Brackets have hot-dip galvanized finish to improve corrosion resistance.

Line Material Industries, McGraw-Edison Co, Milwaukee 1, Wis

(*More New Equipment on page* 94)

PREFORMED ARMOR-GRIP SUSPENSION UNITS provide a

Pretty Soft Life for a Conductor

. . . cradled in durable neoprene

No vibration fatigue here. The Preformed Armor-Grip Suspension Unit (AGSU) eliminates failure by eliminating stress concentration.

The conductor is cushioned in a split neoprene core, held securely by Preformed rods that never lose their tight grip, and supported in an aluminum housing. Conductor is protected and longitudinal stresses are distributed through the entire length of the rods—not at one point.

Like other Preformed line accessories, the AGSU obsoletes bolted hardware. It's easier to apply (no tools needed), costs less, does a better job. You get mechanical strength and electrical protection, and—because of the smooth contour and large diameter of the rod ends—corona emission and radio influence are minimized.

Want to know more about the Preformed Armor-Grip Suspension Unit —or see the application demonstrated? Write PREFORMED LINE PRODUCTS COMPANY, 5349 St. Clair Avenue, Cleveland 3, Ohio. Cable Address: Preformed-Cleveland . . . in 10 years the leading manufacturer of armor rods, dead ends, Guy-Grip dead-ends and other line accessories.

PLP

You can look up to Preformed

Made in accordance with or for use under one or more of the following U. S. Patents: 2,722,393; 2,275,019; 2,587,521; 2,609,433; 2,691,865; other patents pending.

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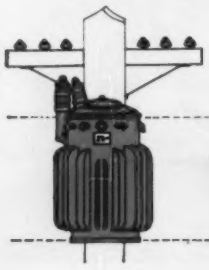
tell you how you can

STOP
LINE OUTAGES
CAUSED BY BIRDS
AND SQUIRRELS

Now—an all-new plastic-coated cover for distribution transformers above 5 kv offers new protection against line lockout . . . Another answer to changing needs, made possible by Plowback of earnings into distribution transformer research and development.

J-70837



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Polarity Tester . . .

. . . can be used on power, distribution, through and split-core transformers. Model R, powered by 3-standard dry cells, will withstand adverse service conditions.
J. W. Dice Co, Englewood, N. J.

Mechanical Trailer Kit . . .

. . . converts trailer chassis for powered loading and unloading of reels up 90-in dia. Reel Safe has rated capacity of 5 tons.

Trailer is attached to truck's pintle hook, then backed to the reel. A steel axle shaft is then inserted through right link of the rig and reel. Left link hooks the opposite end of reel axle. Truck's rear winch pulls the reel forward and up. Reel is secured by two lock pins behind axle bar. Tension is then released on the winch line.
Tel-E-Lect Products, Inc, 10,000 Minetonka Blvd, Minneapolis 26.

Portable Compressor . . .

. . . delivers 16 cfm at 200 psi, or intermittently at 250 psi. Model MB-2 is mounted on 2 wheels, with a retractable 3rd wheel. Compressor is oil-cooled, sliding vane rotary unit, located atop the air receiver and directly connected to an explosion-proof motor. It weighs 800 lbs and is 102 in. long, 44 in. wide and 54 in. high.
Davy Compressor Co, Kent, Ohio

Germanium Rectifier . . .

. . . has an adjustable output from 0 to 110-v dc with a maximum load of 20 amp. Ripple of Model RS40B does not exceed 1% and

regulation is 5-6% from 1/10 to full load at 110-v output. Both front and rear output terminals are above ground and isolated from the a-c input. 4.5 in. panel meters have accuracy of 2% of full scale.
Opad Electric Co, 69 Murray St, New York 7, N. Y.

Silicon Charger . . .

. . . for 12-v electric truck batteries has constant dc voltage output over variation of ±10% in a-c output. It operates on 15-amp, 115-v ac outlet. One model of the AutoReg charges any 6-cell battery up to 450-amp hr; the second handles 6-cell batteries with capacities to 660 amp-hr. An automatic timer cuts the unit off after 16 hr of operation.
C&D Batteries, Inc, Washington & Cherry Sts, Conshohocken, Pa.

Snow Tractor . . .

. . . for checking power lines in snow-covered areas has free floating power unit which allows it to dig down to firm footing in various depths of snow. Called the Sno-Tractor, it seats two people and has towbar for use as tractor in towing heavier loads. When throttle is advanced, clutch engages automatically. Forward speed depends on snow conditions.
Polaris Industries, Inc, Roseau, Minn.

MORE NEW PRODUCTS

Electronic recorder for boiler drum water levels and fluid flow readings accepts output from up to four remote ring balance meter-operated slide wires. Available as an ac bridge, dc potentiometer, or dc voltmeter.—Hagan Chemicals & Controls, Inc, 323 Fourth Ave, Pittsburgh, Pa.

High frequency **induction heated furnace** for carbide sintering is designed for bottom loading. It operates at temperatures from 2500C with special atmospheres.—Ajax Electrothermic Corp, Trenton 5, N. J.

Finned **tubular heater** for forced convection air heating provides rapid heat-up and has totally enclosed insulated construction. The Chromalox Microfin is rated 8 w/sq in., has ¼ in diam, and comes in heated lengths from 5½ in. to 47½ in. with wattages from 525 to 3,000.—Edwin L. Wiegand Co, 7500 Thomas Blvd, Pittsburgh, Pa.

Completely assembled **21-lb inhalator,** with 50-min pure oxygen supply comes in 2 cu ft and 16 cu ft capacities. Twist of valve changes output to 50% air mixture.—Davis Emergency Equipment Co, 47 Halleck St, Newark, N. J.

Type R-64 **silicone resin base** permits aluminum paints to be used in 500-1200 F range on metal smoke stacks and furnace or oven doors.—Union Carbide Corp, 30 E. 42nd St, New York 17, N. Y.

A-c **arc welder** with diverter path design comes in models rated 300, 400 or 500 amp at 40-v, with welding ranges from 35 to 375, 500 and 625 amp respectively.—Hobart Brothers Co, Hobart Square, Troy, Ohio.

Magnetic contactors with one, two or three poles are available in 30, 70, 100, 150, 200 and 300 amp ratings. Mechanically-held 11000 series has separate closing and opening coils. Electrically-held 21000 series operates up to 60 times per min at 80% rated load.—Paragon Electric Co, Two Rivers, Wis.

Compact **tubular centrifugal fan** eliminates costly mounting and ductwork complications. Available in 20 sizes from 500 to 100,000 cfm and up to 12 in. static pressure.—Dryer Electric Corp, 164-66 Wallabout St, Brooklyn 6, N. Y.

High efficiency **screw conveyor** is designed to keep foreign material out of speed reducer. It is available in 4 sizes with ratios of 18:1 and 8:1.—Dodge Manufacturing Corp, Mishawaka, Ind.

Now . . .
serve bulk loads
from the
pole top

WITH
250-KVA
DISTRIBUTION
TRANSFORMERS

Have your Westinghouse representative give you the full story about . . . a better answer to a changing need.

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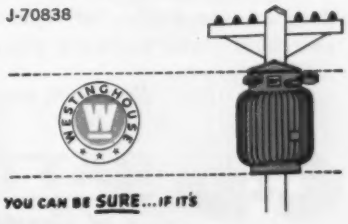

YOU CAN BE SURE . . . IF IT'S

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The battery 'engineered for control' ... 25-year life ... low maintenance

C & D PlastiCal®

What will be happening when the 1980's roll around? The only thing you can be reasonably sure of is that the C & D *PlastiCal®* Control Batteries you install today ... *will not require replacement until then.*

Twenty-five-year life? Yes! C & D "Control" Batteries are not only designed specifically for control, switchgear, and auxiliary power applications—they're engineered to last a quarter of a century. Users even boast that these advanced lead-calcium plate batteries only have to be watered about *once a year.*

For ample, dependable battery power *instantly* when you need it, it pays to specify C & D *PlastiCal.* It pays ... in the long run, too.

For details, send for Bulletin CP-536

C&D BATTERIES, INC.

of Conshohocken, Pa. ... Attica, Ind.

SINCE 1906

SALES AND SERVICE OFFICES IN PRINCIPAL CITIES FROM COAST TO COAST

Books

Impulse Testing

Elektrische Strossfestigkeit. By R. Strigel. Published by Springer-Verlag, Reichpietschufer 20, Berlin W 35, Germany. 407 pages, illustrated. Price M 43.50.

Impulse voltages are methodically analyzed in this German reference book. Extensively revised since the first edition was published in 1939, the new version begins with the sparkover characteristics of air, liquid, and solid insulation under impulse voltage. The second part extensively covers techniques of measuring impulse voltage in the field as well as in the laboratory.

The third part, comprising nearly half the text, analyzes the impulse stresses imposed by lightning, methods for controlling its effect on lines and equipment, and design of insulation structures to coordinate with the impulse voltages to be encountered.

Engineers involved in the design and testing of lines and apparatus and in the application of lightning arresters would find this book a valuable addition to their working library.

FM for the Beginner

Frequency Modulation Engineering. By C. E. Tibbs and G. G. Johnstone. Published by John Wiley & Sons Inc, 440 Fourth Ave, New York 16, N. Y. 435 pages, illustrated. Price $8.50

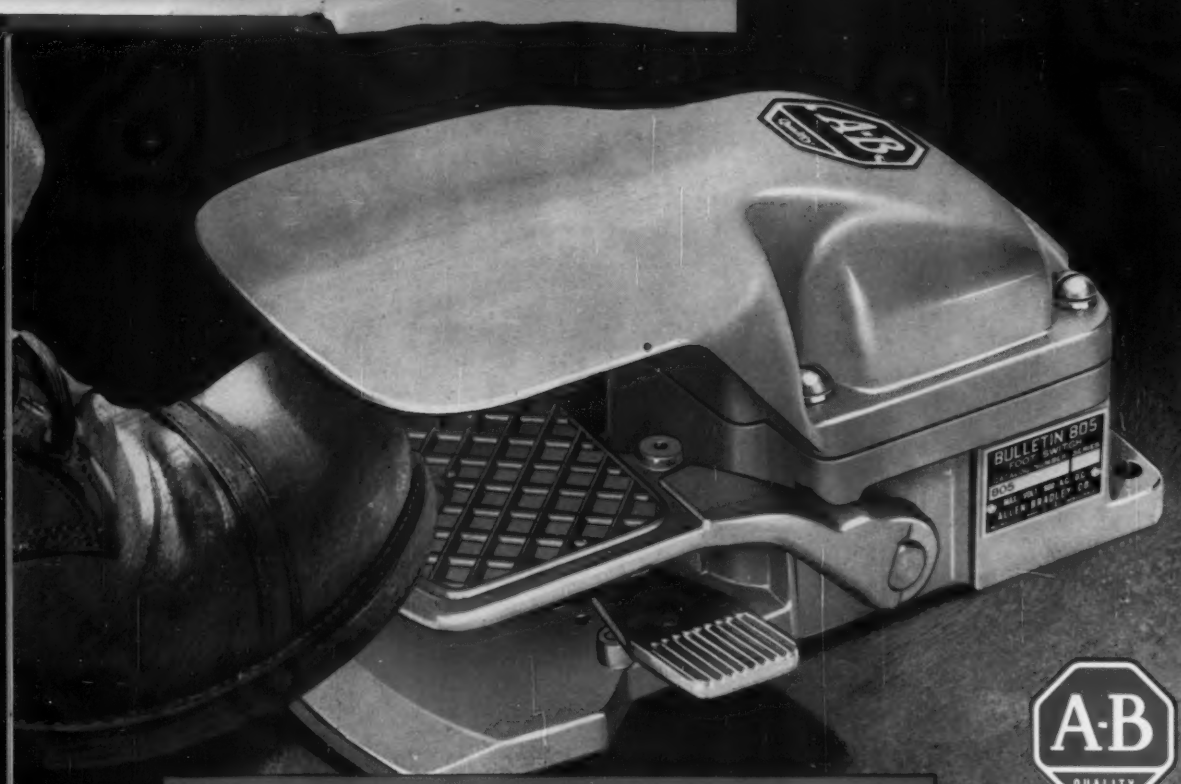
This introductory survey of frequency modulation principles and techniques is a first revision of the 1947 edition. Although written primarily for an engineering audience, it assumes no prior knowledge of the subject. With the exception of a few simple calculus developments, the relatively infrequent mathematical treatments are limited to elementary algebra and trigonometry.

Discussions of noise, interference suppression, and FM propagation are notable for their directness and clarity. A chapter on aerials is one of the most extensive in the book. Treatment of transmitters and receivers include descriptions of typical equipment in common use. Although the authors are British, the equipment discussed is predominantly American.

Books Received Since October 11, 1957

Closed Circuit TV System Planning. By Mayers and Chipp. Published by John F. Rider Publisher, Inc., 116 West 14th St, New York 11, N. Y. 264 pages, illustrated. Price $10.00

Let There Be Light. By Forrest McDonald Published by American History Research Center, 816 State St, Madison, Wisconsin. 392 pages. Price $5.95.



FOOT SWITCHES that can take it!

• **BUILT FOR THE TOUGHEST SERVICE** inside and out—from the maintenance free, snap action, double break, silver alloy contacts to the rugged, die cast aluminum housing—the redesigned Allen-Bradley Bulletin 805 foot switch is a challenge to tough jobs! The on-center treadle operation eliminates the need for bolting down the switch—the extended base keeps it from tipping.

• **VERSATILE OPERATION**—The contact trip point is easily adjustable. When equipped with two contact blocks, this foot switch can be set for simultaneous or two-stage operation. The Bulletin 805 foot switch can also be furnished with a latch to provide maintained contact operation. In addition, this latch, when desired, can be made inoperative, and may be quickly changed from one to the other side of the foot switch.

The Bulletin 805 housings are available for NEMA Type 4 watertight and oiltight applications, or NEMA Type 7 explosion-proof service.

Try the Allen-Bradley Bulletin 805 foot switch—you'll find it "tops" in its field. Send for full information.

Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis.
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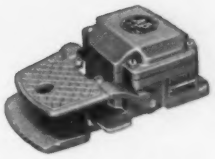
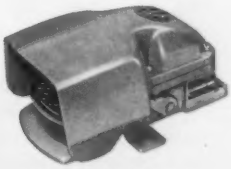


Bulletin 805 Style A switch with latch.

Bulletin 805 Style A switch with latch and top guard to prevent accidental operation.



Bulletin 805 Style A switch with latch and guard covering both top and sides.

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BULLETIN 801

LIMIT SWITCHES

IN A THOUSAND AND ONE TYPES

A-B
QUALITY
Roller lever type in watertight enclosure.
Cutaway view of Bulletin 801 heavy duty limit switch. Note the sturdy construction.
Roller fork type in watertight enclosure.
Lever type for rod or chain operation.
Push type, heavy duty switch.
Center roller, standard duty switch.
Switch with two independently adjustable rollers.
Fork type, snap action switch.

From among the hundreds of Allen-Bradley Bulletin 801 general purpose limit switches, you're sure to find your exact requirements. There are 21 different contact arrangements available, including types with single or multiple poles, N.O. and N.C. contacts, spring return or maintained contacts, with either a slow or snap action mechanism. It will pay you to know this *quality* line of limit switches. If you do not already know this quality line, let's get acquainted. Write for the complete story.

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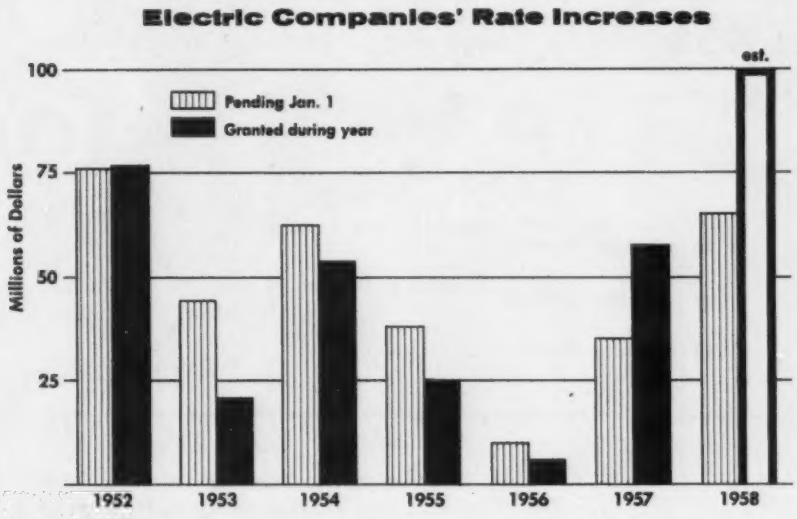
1-58-MR

The Management Newsletter

Report on
Rates and Regulation



Big Year in Rate Making Begins

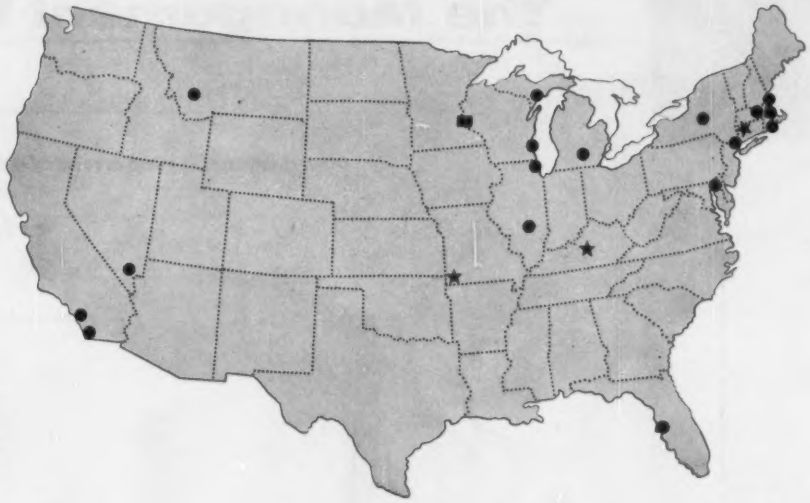
1958 shapes up as an active year on the rate front. Before the year ends, rate increases may reach a record $100 million. Over $65 million a year in hikes were pending before commissions as the year opened. Over $26 million more has been requested since January 1, with more applications expected. Almost $4 million in rate hikes has already been granted this year in four decisions, and a hotly contested ruling in a fifth state turned down a $689,000 bid.

Why all the action? Basically—higher costs are catching up with the power companies. Since World War II tremendous technological strides have reduced the costs of generating power almost as fast as rising wages and equipment prices have pushed them up. But the string is running out. Utilities can no longer completely offset rising costs with larger equipment which brought lower cost per unit of capacity. They have little to gain in operating economy as they add new units. From now on the cost per unit will tend to follow the price of equipment up—no longer offsetting other rising operating costs.

The only place to go for relief is the regulatory commission. Since the beginning of the year, Consumers Power Co., Baltimore Gas & Electric Co, and San Diego Gas & Electric Co have filed for rate increases. Consumers Power, asking for a $12,750,000 annual increase, told the Michigan Public Service Commission it needed higher rates to offset sharp rises in wages, taxes, and material costs that have occurred since its last increase in 1950.

Baltimore G&E cited higher operating costs and "the necessity of attracting large amounts of new capital" as reasons behind its application for a 6.5% boost in electric and gas rates. The hikes, including a 10% increase in steam heating rates, were to have gone into effect on Feb. 14, but the Maryland Public Service Commission ordered the company to delay the increases until after a public hearing on April 2. The electric rate boost would amount to $6,754,000.

Schedule of Action in 1958



● Increases Pending

★ Increases Granted

■ Increases Denied

This year's action is already underway. Kentucky Utilities received a $2,778,000 annual rate increase. They had requested $2,845,000. Commission granted an indicated return of 6.05% plus a small amount for attrition.

Empire District Electric Co won a $500,000 rate hike in its Missouri service area, and $67,000 in Kansas. The Missouri Public Service Commission allowed a return of 6.39% on a depreciated original cost base, which, the commission concluded, "could not be considered excessive at this time." The ruling contained the opinion that present rates "will not permit the company to render good service, and at the same time remain financially healthy."

Housatonic Public Service Co finally got its first rate increase in 38 years when the Connecticut PUC granted a $580,000 annual hike late in January. The request had been pending since last spring. In his letter of request to the PUC, Housatonic's Pres H. R. Bacon had cited the company's record of nothing but decreases in electric rates since 1920, and the fact that many costs had doubled since 1940. (Examples: Wages—up 269%, coal—up 178%, crossarms —up 248%.)

Bacon offered to reduce Housatonic's gas rates at the same time electric rates would be increased, since gas return stood considerably higher than electric return. The proposal would have raised electric revenues by $714,000 a year while cutting gas revenues by $50,000.

PUC approved the gas cut, but allowed only $580,000 in added electric revenue. Net increase to the company (before taxes) amounts to $530,000. New rates went into effect Feb. 1.

The company is "disappointed" with the ruling, as it makes no provision for 1958 construction. Pres Bacon told PUC: "the '58 financing will presumably have to be covered in a new rate increase application to PUC at a later date."

North Dakota's Public Service Commission turned thumbs down on a petition for a $689,000 rate increase by Montana-Dakota Utilities Co. The company had requested the increase to offset a current 4.12% return on net rate base. The commission whittled down the rate base, jacked up operating income, and came up with a 5.71% current rate of return, which it judged adequate.

● Rate Increase Applications Pending

(1958 requests are marked with *)

*Baltimore Gas & Electric	$6,754,000
Boston Edison	2,488,000
California Electric Power	2,009,000
Commonwealth Edison	25,200,000
Consolidated Edison	8,206,000
*Consumers Power	12,750,000
Illinois Power	4,344,000
Montana Power	3,800,000
Newport Electric	183,000
New York State Electric & Gas	4,200,000
Plymouth County Electric	252,000
*San Diego Gas & Electric	6,750,000
Southern Nevada Power	1,000,000
Tampa Electric	1,500,000
Upper Michigan Power & Light	103,000
Wisconsin Electric Power	5,900,000
Worcester County Electric	1,300,000

★ Rate Increases Granted in 1958

	Asked for	Granted
Empire District Electric (Missouri)	$504,000	$500,000
(Kansas)	.....	67,000
Housatonic Public Service	714,000	580,000
Kentucky Utilities	2,845,000	2,778,000

■ Rate Increase Denied in 1958

	Asked for	Granted
Montana-Dakota Utilities (North Dakota)	$689,000	.....

Here's what happened to the rate base:

• **Plant under construction—disallowed in the amount of $959,000.** Said the commission: the plant being built at Sidney, Montana, would not become "used or useful" until the fall of 1958 or later.

• **Working capital and materials and supplies—$843,575 disallowed.** The argument was that because a utility does not have to pay taxes which are accrued this year until next year, it has cash available for working capital.

• **Changed from year-end to average rate base—$279,669 stripped out.** Commenting that a year-end rate base is "unfair to the rate payer," the commission stated: "Net average investment is commonly accepted as a fair valuation of rate base." It cited four jurisdictions (Oklahoma, West Virginia, Wyoming, Arkansas) which have so held. No mention was made of the fact that the commissions of Connecticut, New Jersey, Massachusetts, Virginia, Florida, Utah, Kentucky, Oklahoma, Rhode Island, Maryland, North Carolina, Alabama, Nebraska, New Mexico, Colorado, and Wyoming have used not only end-of-period rate bases, but have in some instances projected rate bases at least six months ahead.

Here's what the commission did to boost operating income:

• **Disallowed merchandising expenses—$18,455.** Commission called 23 appliance stores in North Dakota "an unfair burden upon the rate payer."

• **Disallowed promotion expense—$46,207.** PUC said MDU did not need it.

• **Disallowed liberalized depreciation—$13,000.** In this it chose to follow the decision of the Maine Supreme Court in ruling against Central Maine Power Co.

• **Knocked out five-year accelerated amortization—$162,238.** Here the commission chose not to follow the Maine Supreme Court, which had allowed it.

• **Added income of non-utility affiliate to the utility's net—$39,388.** MDU owns the Knife River Coal Co, and buys some 45% of its production. Commission decided the company is "deriving an excessively high profit from coal which it is actually selling to itself" and adjusted MDU's utility income accordingly. But the rate order also cites MDU Pres C. W. Smith's testimony that fuel cost ran as low as 3½ mills per kwhr, which seems hard to reconcile with the

commission's conclusion that the coal mine's profits were too high. If the cost of fuel were excessive, then an appropriate cut in the price of fuel as it enters into cost of service would be justified. However, transferring amounts from non-utility income to operating income seems illogical, since there is no indication that MDU's investment in the Knife River Coal Co was included in the utility's rate base.

The recomputed rate of return—5.71%—satisfied the commission, but not the company. When asked if they planned to appeal, an MDU spokesman replied: "Certainly we'll appeal. We have no choice."

Meanwhile a $4,200,000 annual rate increase of New York State Electric & Gas Co went quietly into effect Feb. 1— subject to final decision of the regulatory commission. It was only the company's second general rate hike in over 35 years, and the company reported "practically no expressed objections."

The cause: again, increased costs—and earnings insufficient to attract the new capital needed for expansion. NYS E&G pointed out that repeated reductions in their electric rate during the 1940's totaled more than the sum of a 1952 rate increase and the one now under consideration, adding that average cost per kwhr for home use under new rates is still lower than ten years ago.

Too late for inclusion on the schedule above came announcement that Black Hills Power & Light Co, of Rapid City, S. D., had asked the Wyoming Public Service Commission for a general rate adjustment which would provide the company an overall annual increase of about 5% in electric revenue.

Here's a rundown on some other recent regulatory action . . .

In Tennessee, Davidson County Chancellor Ned Lentz upheld constitutionality of a state law requiring the state to pay for moving utility facilities in construction of interstate highways. Appeal to Tennessee Supreme Court is probable.

In New Hampshire, the legislature met in special session to consider a new franchise tax on utilities to replace one invalidated by the State Supreme Court last year (EW, Feb. 3, 1958, p. 108). Gov Dwinell proposed a 4% tax on the annual income of electric and gas companies before taxes.

Maine's Public Utilities Commission authorized minor adjustment of Central Maine Power Co's rates to reflect rises in fuel costs. PUC said the decree will bring no immediate change in rates, and that future changes will not be automatic. Company will show any changes in 12-months average cost of fuel to the commission ten days before each monthly billing date.

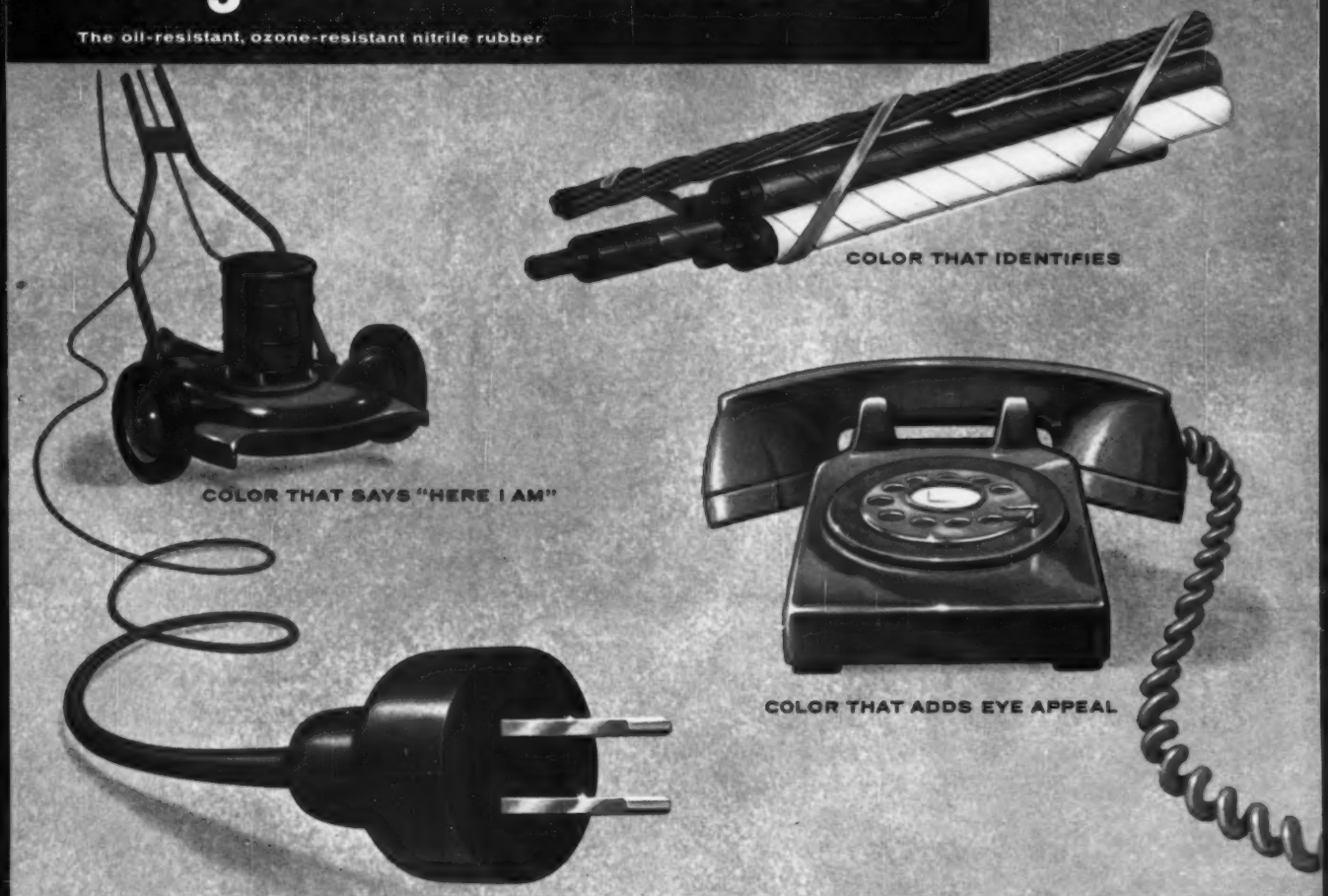
In Arizona, two bills have been introduced which would place electric power districts (including the Salt River District) on property tax rolls.

In the Virginia legislature, one bill to create an agency to represent customer interests in rate cases has been introduced . . . And the House Finance Committee approved a bill favoring the present method of assessing public utilities for local taxation at 40% of true value. Senate has already passed the bill.

Massachusetts House of Representatives rejected a proposal calling for investigation of Boston Edison Co's operations. Advocates of the probe declared that Edison customers in Cambridge pay 50% less than those across the Charles River in Boston. . . . And the House also revoked a bill to allow municipally-operated electric utilities to issue revenue bonds for expansion of service.

Naugatuck PARACRIL OZO

The oil-resistant, ozone-resistant nitrile rubber



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A development of Naugatuck research makes it possible to combine in a vulcanized rubber wire jacket all these properties:

- Excellent resistance to ozone and outdoor "weathering"
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- High abrasion resistance
- Excellent oil, grease and chemical resistance
- Fast CV extrusion

...PLUS PERMANENT BRIGHT COLORS

In addition to the suggested uses, you will think of dozens of other applications where wire jacketing with all these properties can serve either an aesthetic or utilitarian purpose.

One of Naugatuck's technical representatives will be happy to discuss with any prospective user the formulation of the Paracril® Ozo compound which makes possible this combination of properties... not only in wire jacketing but also in shoe soles, hose jackets, weather stripping and other vulcanized rubber products.

Naugatuck Chemical

Division of United States Rubber Company, Naugatuck, Connecticut

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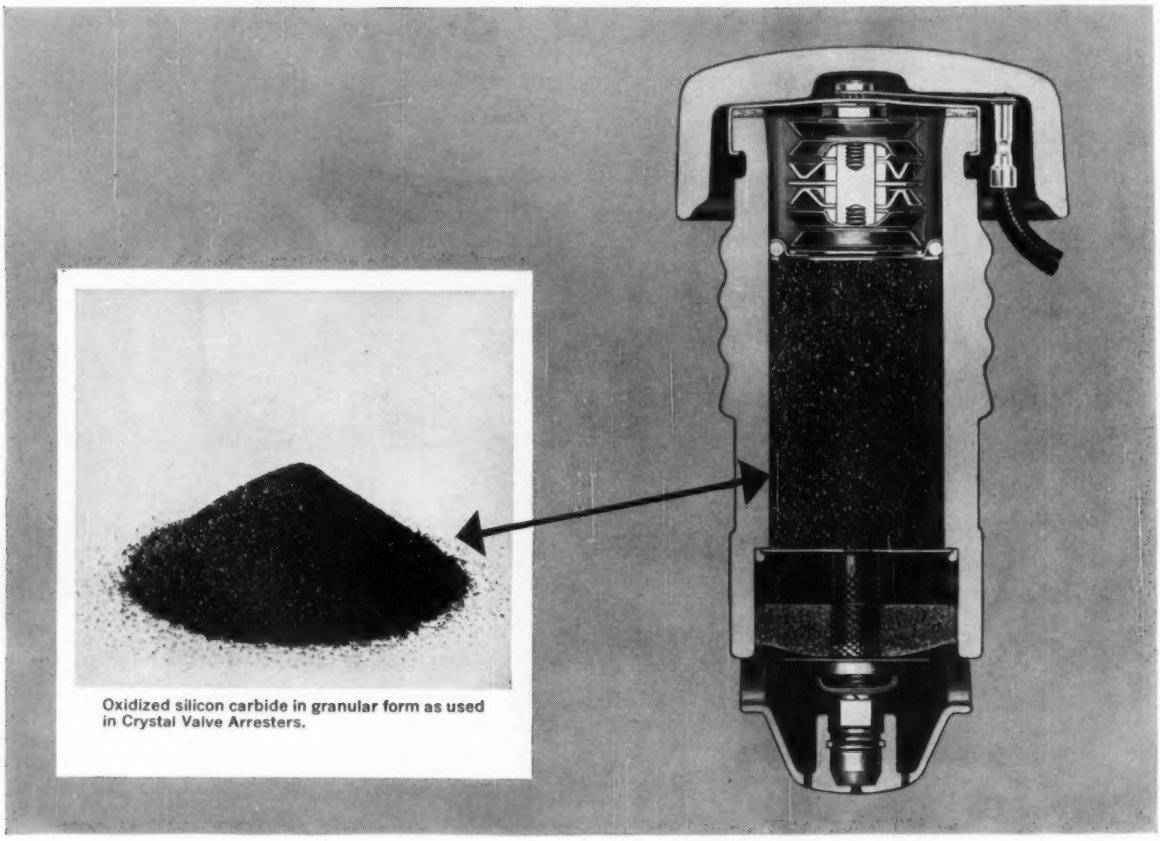
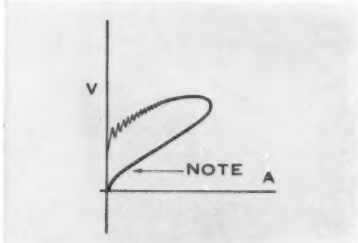
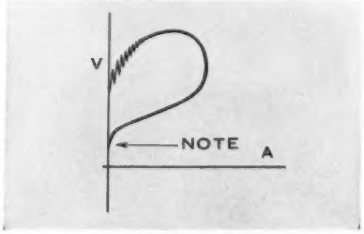


Oxidized silicon carbide in granular form as used in Crystal Valve Arresters.

Why CRYSTAL VALVE ARRESTERS outperform all other lightning arresters



Volt-ampere curve of ordinary valve element. Note that current is not cut off until voltage approaches zero.



Volt-ampere curve of Crystal Valve element. Current is cut off at voltage above zero.

No other lightning arrester has the oxidized silicon carbide valve element that spells the difference in performance for famous Crystal Valve Arresters.

This valve element, composed of optimum-sized granules of oxidized silicon carbide, exhibits unusually high resistance recovery after lightning surges, and very high conductivity to impulse response. As shown by the volt-ampere curves at left, Crystal Valve Arresters cut off current at a voltage above zero, giving a more positive cut-off than is possible with other valve materials.

This balanced combination of resistance and conductivity in Crystal Valve Arresters eliminates the need for a special-type gap to interrupt heavy follow currents; prevents fuse-coordination problems and end-turn failures in transformers. Finally, the Crystal Valve Arrester can cut off higher voltages without failure.

Get the whole story about the efficiency of Crystal Valve Arresters. Call your nearest Delta-Star office or write to *Delta-Star Electric Division, H. K. Porter Company, Inc., 17th & Cambria Sts., Philadelphia 32, Pa. District offices in principal cities.*

H. K. PORTER COMPANY, INC.

DELTA-STAR ELECTRIC DIVISION

Connors Steel, Delta-Star Electric, Disston, Forge and Fittings, Leschen Wire Rope, Quaker Rubber, Refractories, Riverside-Alloy Metal, Vulcan Crucible Steel, H. K. Porter Company (Canada) Ltd.

The Meetings Calendar

FEBRUARY

Pennsylvania Electric Association—Electrical Equipment Committee Winter Meeting, Hotel Roosevelt, Pittsburgh, Pa., Feb. 27-28.

Public Utilities Advertising Association—Regional Meeting, Hotel Windsor, Montreal, Canada, Feb. 27-28.

MARCH

Southern Safety Conference, Inc—Exposition, Peabody Hotel, Memphis, Tenn., March 2-4.

Right of Way Meeting — Electrical World's second conference on R/W practices, procedures, and problems, Conrad Hilton Hotel, Chicago, Ill., March 6-7.

Pacific Coast Electrical Association — Business Development Section, Statler Hotel, Los Angeles, Calif., March 6-7; Engineering & Operation Section, Sheraton Palace, San Francisco, Calif., March 27-28.

Lighting Lamps and Electrical Manufacturers Salesmen's Association—First National Lighting Exposition, Coliseum, New York City, March 9-12.

Nuclear Congress—Co-sponsored by American Society of Mechanical Engineers and the Engineers Joint Council, International Amphitheater, Chicago, Ill., March 16-22.

Interstate Power Club — Hotel Martinique, New York City, March 17.

National Association of Corrosion Engineers—Annual Conference & Exhibition, Municipal Auditorium, San Francisco, Calif., March 17-21.

American Institute of Electrical Engineers and American Society of Mechanical Engineers—Joint Management Conference Committee, Hotel Somerset, Boston, Massachusetts, March 19-20.

Edison Electric Institute — Industrial Relations Committee, Headquarters, New York City, March 20; Annual Sales Conference, Edgewater Beach Hotel, Chicago, Ill., March 24-27.

Institute of Radio Engineers—National Convention, Waldorf-Astoria Hotel and New York Coliseum, New York City, March 24-27.

Northwest Public Power Association—Engineering and Operations Section, Clark County PUD Electric Center, Vancouver, Wash., March 26-27.

American Power Conference—20th Anniversary Meeting, Sherman Hotel, Chicago, Ill., March 26-28.

Oklahoma Utilities Association — Annual Convention, Oklahoma Biltmore Hotel, Oklahoma City, Okla., March 27-28.

Electrical Maintenance Engineers Association of Southern California—Industrial Electric Show and Conference, Shrine Convention Hall, Los Angeles, Calif., March 27-29.

Southeastern Electric Exchange—Annual Meeting, Boca Raton Hotel and Club, Boca Raton, Fla., March 31-April 2.

APRIL

Rural Electrification Administration — 9th Annual Electric Generating Plant Operation and Maintenance Conference, Phoenix Hotel, Lexington, Ky., April 7-10.

Indiana Electric Association—Young Men's Utility Conference, Evansville, Ind., April 8-9.

Microwave Research Institute — Symposium on Electronic Waveguides held in cooperation with Institute of Radio Engineers, New York City, April 8-10.

Rocky Mountain Electric League—Spring Conference, Shirley-Savoy Hotel, Denver, Colo., April 13-15.

• **American Institute of Electrical Engineers**—Rubber and Plastics Industries Subcommittee, Mayflower Hotel, Akron, Ohio, April 14-15; Middle Eastern District Meeting, Washington, D. C., April 28-30.

Edison Electric Institute—National Conference of Electric and Gas Utility Accountants, held jointly with AGA, Shamrock Hilton Hotel, Houston, Texas, April 14-16; Industrial Relations Committee, Headquarters, New York City, April 17; Accident Prevention Committee, Commodore Perry Hotel, Toledo, Ohio, April 27-30; Purchasing and Stores 1958 Annual Meeting, Hotel Nicollet, Minneapolis, Minn., April 28-30.

American Welding Society—Sixth Annual Welding Show, and Technical Meeting, Kiel Auditorium and Hotel Statler, St. Louis, Mo., April 14-18.

• **Northwest Electric Light & Power Association**—Engineering & Operating Section, combined with Personnel & Safety Section and Purchasing Committee, Chinook Hotel, Yakima, Wash., April 23-25.

Agricultural and Mechanical College of Texas—11th Annual Conference for Protective Relay Engineers, College Station, Texas, April 14-16.

Missouri Valley Electric Association—Engineering Conference, President Hotel & Municipal Auditorium, Kansas City, Mo., April 16-18.

• **Southeastern Electric Exchange**—Engineering and Operations Meeting, Buena Vista Hotel, Biloxi, Mississippi, April 21-23.

Northwest Public Power Association, Inc.—Annual Membership Meeting, Ridpath Hotel, Spokane, Washington, April 16-18.

• **Pacific Coast Electrical Association**—Administrative Services Section, Hotel Valley Ho, Scottsdale, Ariz., April 23-24.

Pennsylvania Electric Association—Meter Committee, Galen Hall Hotel, Wernersville, Pa., April 24-25.

• Additions this week.

MORE BIG DATES FOR '58

American Public Power Association—Annual Meeting, New Orleans, May 6-8.

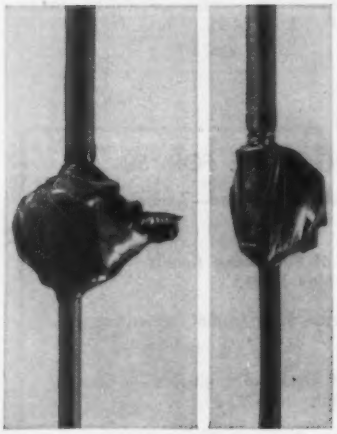
National Association of Purchasing Agents — Annual Convention, Chicago, May 11-14.

Edison Electric Institute—26th Annual Convention, Boston, June 9-12.

American Institute of Electrical Engineers — Summer General Meeting, Buffalo, June 22-27.

National Electrical Manufacturers Association—Annual Meeting, Atlantic City, Nov. 10-14.

New Alcoa 390-490 Series Extruded Parallel-Groove Clamps are More Compact, Easier to Apply



COMPETITIVE CLAMP

ALCOA CLAMP

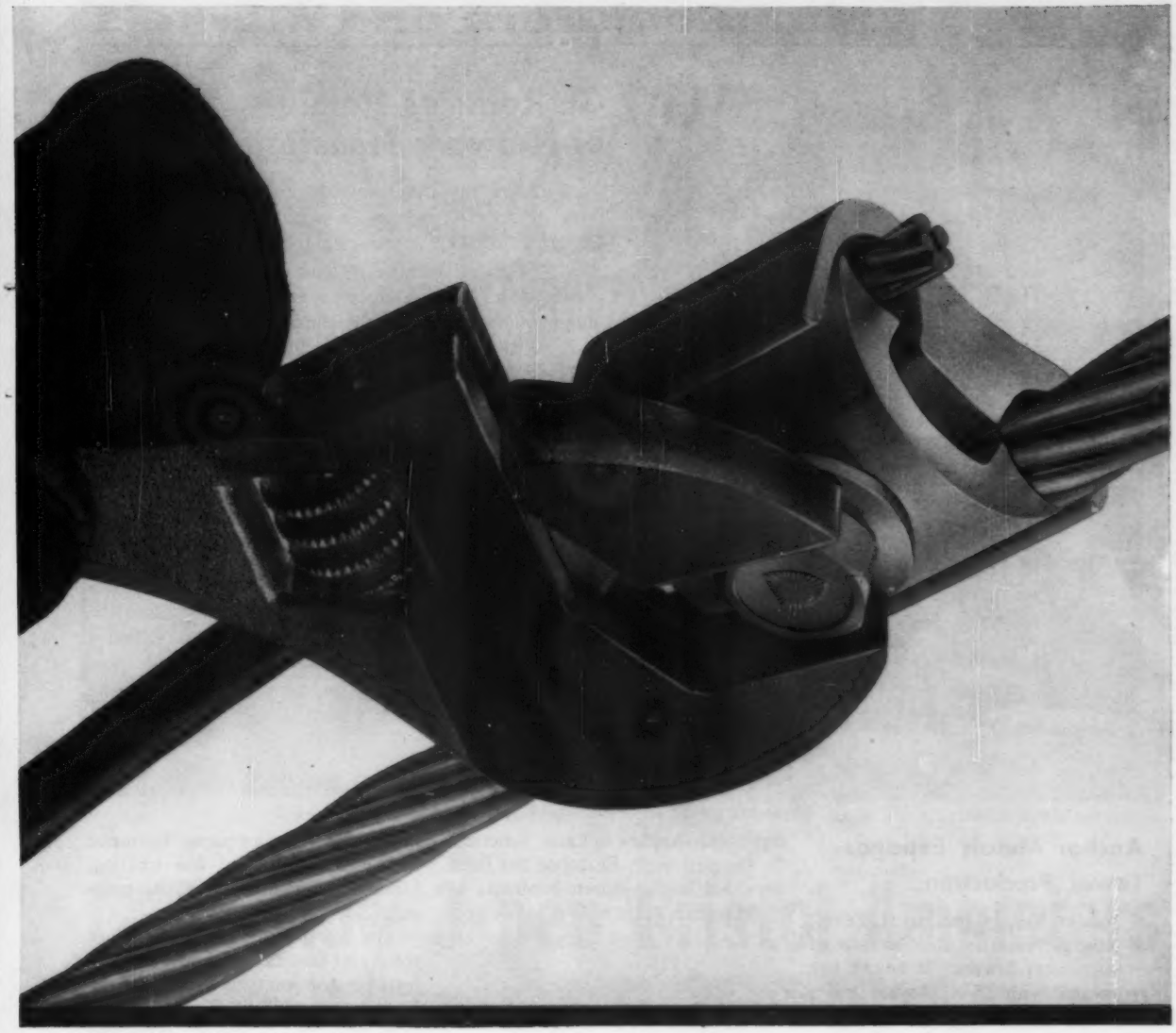
All loose parts eliminated... reduced bulk gives neater appearance

Now you can get the benefits of Alcoa's universal groove design previously announced for heavy-duty clamps. Two new Alcoa single-bolt, distribution and service-drop-type extruded clamps* accommodate ACSR and stranded aluminum sizes #6 to #2 7/1 (Catalog 490.0) and #6 to 2/0 (Catalog 396.6).

Top and bottom parts of the new clamps are Alcoa® Extrusions—made strong, solid and dense from heat-treated alloy. Grooves are specially treated and coated

*Patent applied for

REDUCED BULK in Alcoa's new 390-490 series clamps makes them easy to tape; gives a neat, more compact appearance on the line. makes them easier to store and handle.



to provide low-resistance surfaces. All parts are aluminum to equalize expansion, eliminate corrosion. The new extended lip prevents cap from turning when being applied.

Other benefits you get with these economical new Alcoa clamps are easier application and handling. Loose parts have been eliminated. These clamps can be applied "hot." Bolts are anodized to reduce thread friction. A supply of these clamps on your trucks will cover most distribution applications. Simplified ordering and stocking, and fast delivery, also save you money.

When you specify Alcoa parallel-groove clamps, you also buy the experience gained during a quarter of a century of manufacturing clamps and other accessories for aluminum . . . plus years of extensive laboratory testing. Ask your Alcoa representative to show you samples of these clamps. Call him today for full information, or write Aluminum Company of America, 2306-B Alcoa Building, Pittsburgh 19, Pennsylvania.

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ALUMINUM COMPANY OF AMERICA

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Exciting Adventure,
Alternate Monday Evenings

GE Reduces Height of Network Transformers

A line of network transformers with height reductions of 9 to 12 in. has been introduced by General Electric Co. Called the Vault-Master transformers, they will enable utilities to save money on new vault construction, to pack more capacity in existing vaults, and provide for easier installation and maintenance. A 750-kva unit is shown being lowered into a vault.

Three-phase ratings from 300 to 1,000 kva are included in the 15-kv class, and will later be extended to the 22-kv class. Improved grain orientation of core steel and a new laced-core design permit a smaller core-and-coil for the same kva output. This core-and-coil has a more balanced thermal design and a lower height gradient.

Internal size reduction permits increasing the space between tank and flat-panel radiators for better dissapation of heat without increasing the floor area of the whole transformer. Throat connections for network protectors have also been lowered to keep the protectors and their bushings in most ratings below the level of the transformer top.

Anchor Metals Expands Tower Production

Anchor Metals, Inc, Hurst, Texas, is engaged in the manufacture of transmission towers. It began five years ago with 25 employees and a single $200,000 contract from Texas Electric Service Co. Today it has more than 225 employees, sales totalling $3,500,000 as of January 31, 1958, and two plants, one in Hurst and another in Fort Madison, Iowa. A goal of $5,000,000 plus in sales has been set for 1958.

Officers of the company are: Clyde F. Mooney, president; J. O. LeGate, vice president; Gilbert L. Jackson, secretary-treasurer; Charles Durkee, Jr, plant manager; and R. J. Van Somer, manager of sales and engineering. Officials at Fort Madison are, Wallace J. Anderson, executive manager, and Darrell McLemore, production manager.

The Fort Madison division, which began operation in November, 1957, will serve customers in the north central area of the U. S.

A Mexican firm, Aceros Ecatepec represents Anchor in Latin America. In the past year, Ecatepec has been awarded half a dozen contracts to build transmission towers in Mexico.

G&W Develops Stop Joints for 200 Psi Pressure

Stop joints to interconnect power cable systems having up to 200 psi nominal pressure differential on the pressure media have been developed and are being manufactured by G&W Electric Specialty Co, Blue Island, Ill. Designs have been made for conductor sizes up to 2750 Mcm. These Hi-Lo joints may be adapted to all high voltage power cable systems.

The pressure systems of the cables being connected are completely isolated from each other by porcelain stop tubes. Multiple copper strap connections between cable connectors make possible a completed current path without placing mechanical stress on the stop tubes even with some misalignment of connecting parts. Entrance fittings are provided for treating, filling and monitoring of the pressure media.

The company reports satisfactory results of mechanical and electrical tests on stop joints to connect 69-kv low-pressure oil-filled cable with high-pressure oil-filled pipe-type cable. Electrical tests made were in accordance with AIEE No. 48—Standards for Potheads and High Voltage Time Test of AEIC Specifications for Pipe Type Cable.

L-M to Distribute Anesite Plastic Conduit

Line Material Industries has been selected national distributor of Anesite plastic conduit and fittings according to W. C. Hess, president of Anesite Co.

L-M will handle Anesite's flexible and rigid conduit in standard sizes from ½ in. to 4 in. for electrical applications. The new line will com-

(*Continued on page* 110.)

NEW BRISTOL 3-PEN AMMETER ideal for checking balance in 3-phase system.

1-, 2-, now 3-pen Bristol Ammeters

EXTREMELY COMPACT, the Bristol 641 "folded-chart" ammeter is available in 1- or 2-pen models.

You can record up to 3 related or independent currents on one Bristol instrument (similar voltmeters available)

Bristol's recording ammeters now can have as many as 3 independent moving iron elements.

These are the same rugged, stable, high torque, low burden elements that have earned Bristol ammeters such a reputation for accuracy and dependability on utility and industrial applications. For fixed installation, ammeters come in models for flush-panel mounting, surface-panel mounting or interchangeable surface or flush-mounting with either terminal stud or conduit connections. Units also come in a portable model and a portable or pole mounting model. And look at these big features:

Accuracy—1% of scale.
High actuating torque—gives positive recording. Leveling not critical.
Low electrical burden—5VA at 5 or 10 amps.
Stability of calibration—field calibration (seldom required) easily done without special skill or tools.
Rugged construction—shock proof bearings. Pen locks for transport.

Write for complete data on Bristol 1-, 2-, or 3-pen recording ammeters or voltmeters. The Bristol Company, 116 Bristol Road, Waterbury 20, Conn.

8.11

BRISTOL TRAIL-BLAZERS IN PROCESS AUTOMATION
AUTOMATIC CONTROLLING, RECORDING AND TELEMETERING INSTRUMENTS

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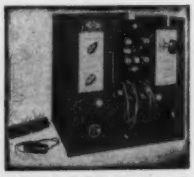
Leaders in Electrical Testing Equipment

States Test Tables require no special rotating standards and may be equipped to test 2 and 3 element meters, socket and bottom terminals, as well as single phase.

FORM "FRS"—Single position table with photo-electric control. Will test single phase and 2 and 3 element polyphase meters.

FORM "HAPBL"

Dimensions: 20" x 20" x 15". Other styles of this table may be furnished equipped with photo-electric control.



"FRD"—Two position photo-electric only or photo-electric and "push-button" automatic sequence.

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plement the Permaline bituminized fiber products manufactured by L-M.

W. M. Bloom, L-M product manager for fiber products, will be responsible for the sales and promotion of Anesite products.

New Rubber Consumption In U. S. Nears High Mark

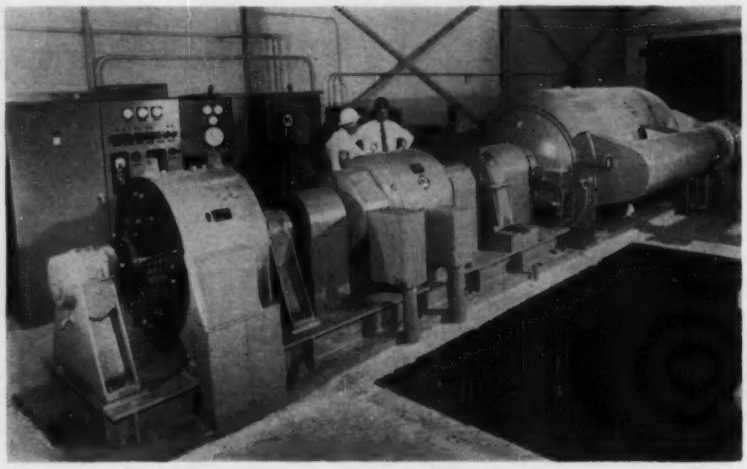
New rubber consumption in the United States during 1957 amounted to 1,467,506 long tons, the second highest on record, according to the Rubber Manufacturers Association, Inc, New York. Record high consumption was 1,529,699 long tons in 1955. In 1956, new rubber consumption totalled 1,436,482 long tons.

Synthetic rubber consumption of 928,359 long tons in 1957 was a new record high, compared with 874,394 long tons in 1956. Natural rubber consumption amounted to 539,147 long tons in 1957, down from 562,088 long tons in 1956. Of the total new rubber consumed in 1957, synthetic rubber amounted to 63.26%. The 1956 ratio was 60.87%.

Reclaimed rubber consumption in 1957 totalled 268,088 long tons as compared to 270,547 long tons for 1956.

U. S. Copper Production

Primary copper production in the United States for the month of December, 1957, amounted to 94,388 tons, as compared to 90,045



A-C Synchronous Condenser Controls Voltage Fluctuations at Arc Furnace

A 30,000-kva hydrogen-cooled synchronous condenser stabilizes voltage conditions in an arc furnace in a southern steel plant.

Low-reactance synchronous condensers are frequently operated in parallel with arc furnaces to reduce voltage fluctuations. An unusually low transient reactance—20.6% as compared with a normal 30%—makes this condenser suited for this application.

This machine, a product of Allis-Chalmers Mfg Co, is rated at 13.8-kv, 3,600-rpm, 3-phase, 60-cps. It features both stator and rotor coils cooled by hydrogen gas flowing at high velocity in direct contact with conductor copper. By using this cooling system a significant reduction has been made possible in the physical size of the unit.

A 700-hp, 2,300-v, 1,740-rpm, wound-rotor induction motor starts condenser through gearing with a 175-kw 135-v, 1,750-rpm, dc exciter.

in November, according to the Copper Institute, New York. Refined copper production for December was 136,135 tons, an increase over the 128,218 reported for November. Deliveries to fabricators dropped to 84,611 from the November total of 106,799. Refined copper stocks were 181,024 tons for December, as against 161,552 in the previous month.

M & M BRIEFS

Merritt-Chapman & Scott Corp, New York, has been awarded a $100 million contract by the Power Authority of the State of New York for the consruction of the Lewiston power plant on the Niagara project.

Kaiser Aluminum & Chemical Corp poured first primary aluminum at its new $200-million production and fabrication center at Ravenswood, W. Va., recently. Planned annual capacity is 145,000 tons. Power for the plant is provided under a 40-year contract with Ohio Power Co.

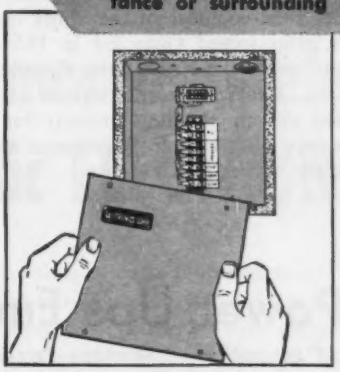
Rome Cable Corp, Rome, N. Y., has received a "Plant Protection Award" from the New York State Civil Defense Commission.

ACF Industries, Inc, Avion Division, Dayton, Ohio has produced an airborne closed-circuit television device, known as the Horizontal Situation Display. It automatically correlates information fed into it by navigational computers and instruments and presents a TV picture in the form of a map of the terrain below the plane.

H. K. Porter Company, Inc has acquired Kidd Drawn Steel Co, Aliquippa, Pa. manufacturer of drill rods and other special shapes of cold-drawn steel.

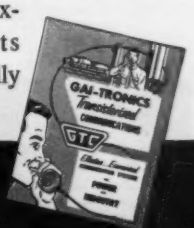
Philco Corp, Philadelphia, held its first "TRANSAC" (TRANSisitorized Automatic Computer) orientation seminar in January for 23 representatives from government and industry.

Now! It's Here
GAI-TRONICS
Transistorized
COMMUNICATIONS
GTC
* an effective, economical industrial communication system designed to provide swift and sure voice communications regardless of distance or surrounding noise conditions.



GTC completely eliminates the need for costly, space consuming central control panel equipment and complicated wiring. Just two pairs of unshielded wires run between stations. The inconvenience and expense of vacuum tube failure is now a thing of the past.

GTC Handset Stations and Loudspeaker Amplifier Assemblies may be installed and field-wired anywhere. Merely "plug-in" amplifier units when ready to use. Installation, maintenance and expansion costs are drastically reduced.



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News About People

San Diego G&E Has New VP

The board of directors of San Diego Gas & Electric Co has elected Sherman Chickering as a vice president of the utility. He was named to fill the vacancy caused by the recent death of his father, Allen L. Chickering.

The new vice president is a member of the San Diego G&E board of directors and of the company's executive committee. A graduate of the University of California and Harvard University Law School, he is a member of the San Francisco law firm of Chickering & Gregory, general counsel to the utility.

SHERMAN CHICKERING

Ohio Edison Advances Rothfus

Elmer A. Rothfus, general system planning engineer for Ohio Edison Co for the past two years, will advance to the newly created position of chief electrical engineer of the utility on March 1.

Rothfus, who joined Ohio Ed in 1956, previously gained 10 years utility engineering experience with Commonwealth Associates, Inc, and predecessors. While there, he was in charge of distribution and subtransmission system planning projects for Ohio Ed and other utilities. His experience also includes equipment application work with generating plants and substations.

Montana Power Ups Eminger

New superintendent of generation of Montana Power Co is William D. Eminger. He succeeds Ricklef A. Reid, who requested retirement because of his health.

A veteran of 34 years with the utility, Eminger has been superintendent of Great Falls generating plants and will move to headquarters at Butte when he takes over the new position.

An electrical engineering graduate of Tri-State College, Eminger joined Montana Power in 1924 as a lineman. Most of his service with the company has been in the Great Falls generating plants.

Bridler Gets St Lawrence Post

Eugene F. Bridler was recently appointed to the position of chief system operator for the St. Lawrence power project. The facility is now being constructed by the Power Authority of the State of New York at Barnhart Island, Massena, N. Y.

In his new position, Bridler will be responsible for all operations at the power plant and on the transmission system. His early duties will also include the recruiting of an operating force.

Prior to this appointment, Bridler was chief operator at Bureau of Reclamation's Davis Dam on the Colorado River.

THE BEST COSTS LESS INSTALLED

Republic ELECTRUNITE E.M.T. was used throughout the construction of the Medical Building, San Diego, California. Owner: San Diego Investment Corporation; Architect-Engineer: Richard George Wheeler and Associates; General Contractor: Trepte Construction Co.; Electrical Contractor: Capitol Engineering Co.

Build today for tomorrow's electrical loads. Specify Republic ELECTRUNITE E.M.T.

Utilization of tomorrow's power for residential, commercial, and industrial requirements can be economically provided by building today with ample-sized electrical conduits. Conduits that will adequately provide for future electrical loads.

The built-in economies of Republic's ELECTRUNITE® E.M.T. provides for present and future electrical wiring protection that should be investigated now. These economies are the reason why . . . the *best* costs *less* installed.

Best . . . because the complete wire protection required is provided with ELECTRUNITE E.M.T. in accordance with the National Electrical Code. ELECTRUNITE is produced to A.S.A. Specification C80.3 and Federal Specification WW-T-806, latest revisions, and carries the Underwriters' Laboratories Seal of Inspection.

Best . . . in installation advantages, too! Easy to measure with exclusive "INCH-MARKS"®. Easy to bend with full-length "GUIDE-LINE" features. And "INSIDE KNURLING" makes wire pulling easier, too.

Best . . . because these timesaving, laborsaving advantages may be applied to the purchase of more load-bearing equipment and conveniences at no extra cost. That's why utilities should not only recommend ELECTRUNITE E.M.T. for their customers—but should also consider Republic ELECTRUNITE E.M.T. for their own plants and installations.

It will pay you to check into the electrical flexibility possible with Republic ELECTRUNITE E.M.T. Call your Republic representative or write for details and data.

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STEEL AND TUBES DIVISION

REPUBLIC STEEL

Cleveland 8, Ohio

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STEEL AND TUBES DIVISION
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Please send additional information and literature covering Republic ELECTRUNITE E.M.T.

Name_____ Title_____

Firm_____

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VP's Are Appointed by Sylvania Lighting Unit

Sylvania Lighting Products, a division of Sylvania Electric Products, Inc, has appointed as divisional vice presidents Henry F. Callahan, O. Howard Biggs, and Garlan Morse. They will all make their offices at lighting products headquarters in Salem, Mass.

Callahan, division general manager since 1956, becomes vice president-lighting products. A veteran of 35 years with the firm and predecessors, he has held product engineering and supervisory posts in Salem and other company plants. He became general manufacturing manager-lamp plants in 1947 and general manufacturing manager of the division in 1950.

Biggs, whose new title is vice president-engineering, has been chief engineer in Salem since 1947. Since joining a company predecessor in 1927, he has been supervisor-product development and general manager-special products.

Morse, who rises from general sales manager to vice president-lighting sales, has spent most of his 22 years at Sylvania in sales. He once was district sales manager, division merchandising manager, and Pacific Coast director of sales.

H. F. CALLAHAN | O. H. BIGGS | GARLAN MORSE

Dr Thomas Heads Battelle

Dr B. D. Thomas was recently appointed to the presidency of Battelle Memorial Institute. He replaces Dr Clyde Williams, who has retired.

Dr Thomas, active head of Battelle since being named director last year, had been vice president. He joined BMI in 1934 as research engineer.

Interior Honors Starr

Eugene C. Starr, chief engineer of Bonneville Power Administration, has been presented the Dept of Interior Distinguished Service Award and gold medal.

Starr, a pioneer in many new fields in high voltage transmission, has made outstanding contributions in uses of nuclear fission to generation of electricity.

Dows' Hobby Brings Rewards to IL&P and City

For an unusual pastime which snowballed into a public relations project, Iowa L&P Pres Sutherland Dows (left) was recently honored by Cedar Rapids Chamber of Commerce.

It started out when Dows, lamenting the dearth of local historical data, had an artist paint a seven-picture series on the area's development. Then things began popping. A local paper ran a feature on the paintings, then hanging in IL&P offices. The public streamed in, bringing requests for reproductions. Dows produced a coloring brochure—"Seven Ages of a City"—to meet demand. Another newspaper feature followed. Demand for the brochure soared. And now, industrial development prospects over the nation are responding favorably to their copies, thoughtfully sent by the Chamber.

Peters Elects VP's

J. J. LOWE

James J. Lowe and Charles A. Chabot were recently elected as vice presidents of the Peters Manufacturing Co of Wollaston, Mass.

C. A. CHABOT

In his new capacity, Lowe will be in charge of marketing for the company. He most recently served as sales manager of American Manufacturing Co, Brooklyn, N. Y.

Chabot will now head up the Research and Development Division at Peters. He was previously associated with the American Steel & Wire Co.

PERSONAL BRIEFS

George A. Olmstead was recently elected treasurer of Consumers Power Co . . . New assistant secretaries and assistant treasurers of Detroit Edison Co are **Virgil K. Rowland** and **Miss Julia Hopf.**

Miss Thelma T. Jones was named to succeed **Miss Kate Allen Niblack,** retired, as secretary and assistant treasurer of Oklahoma Utilities Assn.

The rank of Fellow of American Society of Mechanical Engineers has been granted to **A. C. Pasini** of Detroit Edison Co and **A. J. Ferretti** of Northeastern University . . . **Norman F. Plante,** controller of Western Massachusetts Companies, has been elected to membership in Controllers Institute of America.

Charles A. Barnes is new controller for P. R. Mallory & Co, Inc. He replaces **George M. Arisman, Jr,** now president, Mallory Battery Co . . . Square D Co has named **Eugene Lepkowski** controller of a newly formed assembly division.

(*More Briefs on page* 116)

These supplementary pages, just off the press, contain blueprints and complete specifications on revisions and additions to our line of Drop-Forged Steel and Aluminum Hi-Line Hardware.

Bring your BTC Hi-Line Hardware Catalog up to date . . . send for these FREE supplements today. If you do not have a catalog, indicate this on coupon and a complete, revised copy will be mailed to you without charge.

Pioneers in Drop-Forged Hi-Line Hardware

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HI-LINE HARDWARE DIVISION
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☐ Please send supplementary Pages for BTC Catalog.
☐ Send complete, revised BTC Hi-Line Hardware Catalog.

NAME _____ TITLE _____
COMPANY _____
STREET _____
CITY _____ STATE _____

Ralph B. Norton succeeds **Alan S. Dana** as chief engineer of the Kerite Co. Dana is now consulting engineer . . . **Michael L. Kaplan** is president of the newly organized Stretch Wire Corp, makers of extensible cables for the electrical and electronic industries.

Burns & Roe, Inc, has appointed **William G. Carlson** project engineer to supervise an assignment for the Atomic Energy Commission Hanford Operations office. He will work on preliminary design of supporting facilities for a large-scale reactor to produce nuclear materials.

Joseph T. Ryerson & Son, Inc, recently named **Meryl B. Draper** general superintendent of the Wallingford (Conn.) steel service plant. In the Operating Division, **Herbert G. Dent** was named engineering consultant to the VP-operations and **Stanley J. Miller** became director of plant engineering.

Dr. Augustus B. Kinzel, Union Carbide Corp VP, became 1958 president of American Institute of Mining, Metallurgical, and Petroleum Engineers on Feb. 18.

M. W. Kellogg has named as assistant sales vice presidents **M. J. Carnesale** (for parts of the U. S. and all of Central and South America), **W. T. McCay** (mid-continent and Gulf Coast area) **J. A. Petrie** (Eastern Hemisphere and Canada), and **J. M. McAneny** (Fabricated Products and of engineering and construction services). New assistant operations vice presidents are **L. J. Kelly,** engineering; **H. R. Schuster,** procurement; **J. W. Smith,** construction; and **F. E. Johnson, Jr,** contract operations.

Midwest Research Institute has named **H. L. Stout** assistant manager; Engineering Division; **Arthur Laudel, Jr,** as head, electrical engineering section; **N. E. Welter** as head, systems engineering section; and **R. H. Scheil** as supervisor, laboratory operations.

Stone & Webster Engineering Corp has appointed **T. E. Casselman, Jr,** as assistant engineering manager, **Norman L. Foskett** as chief engineer of the Chemical Division, and **Stanley B. Zdonik** as chief process engineer.

At I-T-E Circuit Breaker Co, **Gerald E. Hertig** is new substation application engineer for the R&IE Equipment Division.

Copperweld Steel Co's Wire and Cable Division recently advanced **Lou McGuire** to Eastern sales manager. **Ralph Craig** replaces him as Pacific Northwest district manager.

Robert H. Weeks, Jr, succeeds **George E. Stringfellow** as vice president and division manager of the Storage Battery Division, Thomas A. Edison Industries . . . **Paul J. Steil** is newly named controller of Willys Motors, Inc.

At Western Precipitation Corp, **Edward R. Lawlor** has become product sales manager for Multiclone dust collectors . . . **Loren D. Barre** rises to marketing manager of RT&E Corp.

Newly promoted at Radio Frequency Laboratories, Inc, were **Henry H. Emker,** to vice president-marketing, Communications Products Division; **Roger S. Kingsland** to VP-purchasing; and **Harry Parliment** to VP-production.

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SALES ASSIGNMENTS

COMPANY STAFFS

Allis-Chalmers Manufacturing Co has designated Frank M. Nolan as manager of sales, switchgear department.

Burndy Corp's Utility-Industrial Division has named two new assistant sales managers. They are Herbert Grossman, who will handle commercial activities, and Richard Harap, product activities.

Colorado Fuel and Iron Corp's Wickwire Spencer Steel Division recently named Kenneth J. Butler as assistant sales manager of springs and formed wire department.

General Electric Co's silicone products dept has appointed Dean Daniels as western district sales manager, with offices in Downey, Calif . . . J. R. O'Hara is new sales representative of die sales sub section, metallurgical products dept. His area includes New York, Pennsylvania, and New Jersey.

Kaiser Aluminum & Chemical Sales, Inc, has announced the recent appointment of R. A. McDuffie as electrical conductor sales supervisor in the Atlanta district.

Ohio Brass Co has named W. B. Owens as district manager for Georgia, Florida, and Alabama (co-operating in the latter state with Shook & Fletcher). Kirkwood Otey becomes district manager for North and South Carolina and portions of Tennessee.

Joseph T. Ryerson & Son, Inc, has appointed R. T. Harvey as national product manager for the marketing of aluminum.

Standard Transformer Co has designated J. F. Kerrigan as sales representative in Connecticut.

Sylvania Electric Products, Inc, recently designated H. Robert McClellan as sales manager of the newly created southern region of its Lighting Products Division. The new region, with headquarters at Atlanta, Ga., encompasses the Atlanta, Charlotte, and Dallas districts. James F. Hagan succeeds him as Atlanta district sales manager.

Westinghouse Electric Corp has advanced J. J. Riggs to district manager for appliance sales in Detroit . . . Donald M. Canfield is new Cincinnati district sales manager for the firm's Lamp Division.

Western Precipitation Co has designated John G. Rehm as sales engineer in the Pittsburgh area to specialize in power plants, cement plants, and other applications.

REPRESENTATIVES

Automatic Switch Co has appointed the following authorized stocking distributors of Asco solenoid valves: Electrical Engineering & Equipment Co of Des Moines, Iowa; and Industrial Equipment Co of Houston, Tex.

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FPC Reports 567 Mw Gain in October

PLANT ADDITIONS DURING OCTOBER

State	Utility	Plant	Fuel	Capacity
Del.	Delaware Power & Light Co	Indian River	S	75,000
Ga.	U. S. Army Engineers	Buford	H	40,000
Ky.	East Kentucky Rural Electric Co-op	Dale	S	66,000
Me.	Bangor Hydro-Electric Co	Graham Station	S	16,500
Minn.	Mora Municipal Electric Utility	Mora	IC	1,136
Neb.	Nebraska City Utilities	Nebraska City	IC	3,100
Neb.	Beaver City Light & Water Dept	Beaver City	IC	500
N. Y.	Fishers Island Electric Corp	Fishers Island	IC	750
Ore.	California-Oregon Power Co	Eagle Point	H	2,813
Ore.	U. S. Army Engineers	Dalles Dam	H	78,000
Tenn.	Tapoco, Inc	Chilhowee	H	16,666
Tenn.	Tennessee Valley Authority	John Sevier	S	180,000
Tex.	Brownfield Municipal Light Dept	Brownfield	IC	3,620
Wash.	Puget Sound Power & Light Co	Snoqualmie 2	H	20,000
Wash.	U. S. Army Engineers	Chief Joseph	H	64,000
	RETIREMENTS			
Md.	Eastern Shore Public Service Co	St. Michaels	IC	475
Mich.	Consumers Power Co	Lyons	H	450
Minn.	Mora Municipal Electric Utility	Mora	IC	482
Minn.	Public Utilities Commission	Hawley	IC	70
Neb.	Beaver City Light & Water Dept	Beaver City	IC	150

U. S.	Hydro	Steam	IC	Total
Added	221,479	337,500	9,106	568,085
Retired	450	.....	1,177	1,627
Adjustments Plus	.....	.....	3,025	3,025
Adjustments Minus	.....	2,000	408	2,408
Net Change	221,029	335,500	10,546	567,075

H—Hydro, S—Steam, IC—Internal Combustion.
U. S. Capacity as of November 1—Hydro, 26,907,677 kw; Steam, 97,388,665 kw; IC, 2,510,784 kw; Total, 126,807,126 kw.

. . . 706 Mw Gain in November

PLANT ADDITIONS DURING NOVEMBER

State	Utility	Plant	Fuel	Capacity
Colo.	Delta Municipal Light & Power Dept	Delta	IC	2,130
Fla.	Florida Public Utilities Co	Fernandina	IC	2,000
Iowa	Iowa Southern Utilities Co	Bridgeport	S	20,000
Kan.	Meade Municipal Light & Water Dept	Meade	IC	1,136
La.	Southwestern Gas & Electric Co	Lieberman	S	100,000
Mich.	Detroit Edison Co	River Rouge	S	260,000
N. C.	Duke Power Co	Allen	S	165,000
N. M.	Public Service Co of New Mexico	Person	S	33,000
Utah	Bountiful Electric Dept	Bountiful	IC	1,000
Wis.	Wisconsin Electric Power Co	Oak Creek	S	130,000
	RETIREMENTS			
Calif.	California-Oregon Power Co	Crescent City	IC	625
Calif.	California-Oregon Power Co	Yurok	IC	160
Ind.	Peru Electric Light Dept	Peru	S	4,500
Kan.	Meade Municipal Light & Water Dept	Meade	IC	160
Miss.	Mississippi Power & Light Co	Port Gibson	IC	100
Mo.	Cameron Light & Water Dept	Cameron	IC	200

U. S.	Hydro	Steam	IC	Total
Added	....	708,000	6,266	714,266
Retired	....	4,500	1,245	5,745
Adjustments Plus	600	4,250	1,500	6,350
Adjustments Minus	....	8,300	610	8,910
Net Change	600	699,450	5,911	705,961

H—Hydro, S—Steam, IC—Internal Combustion
U. S. Capacity as of December 1—Hydro, 26,908,277 kw; Steam, 98,088,115 kw; IC, 2,516,695 kw; Total, 127,513,087 kw.

Network Plants Qualify for Some Tax Exemptions

A tax "gimmick" employed by many communities desiring to attract new industry is an offer to exempt plant property of the new industry from ad valorem taxes either permanently or for some limited period. This offer sometimes extends to county, as well as city, taxes.

Electric utilities serving primarily a single community cannot obtain the exemptions for a new plant, since the economics limit the location. City taxes may be avoided in these cases by locating the plant beyond the city limits.

However, when the new plant is to form part of a network serving a number of communities in various counties, it may be possible to negotiate for permanent or limited exemptions from county ad valorem taxes where the plant will be outside the city, or as to both city and county taxation if it must lie inside.

When outside city limits, it may be legally possible to obtain a commitment from the city that, if limits are extended to include the plant, a permanent or temporary ad valorem tax exemption applies. Occasionally the boundaries are extended arbitrarily if the city needs revenue and wishes to subject the plant to a city tax levy.

Fuel Saving to Highlight Illinois Power Conference

Economic comparisons of transporting energy, fuel availability, outlook for high energy fuels, and underground gasification are topics included in the program for American Power Conference, March 26-28, in Chicago.

Nuclear power, transmission, pumped storage, supercritical steam plant operation, and heating and air conditioning are among other fields that will be discussed in about 30 sessions. The meeting is sponsored by Illinois Institute of Technology.

Next week's issue of Electrical World will carry a full report on the technical session of the AIEE General Winter meeting. The 12 page feature brings into sharp focus discussions at the annual meeting.

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QU.	KVA	MFGR.	VOLTAGE
4	1667	Mol.	69,000–34,500
2	1500	Penna.	69,000–4160/2400, 3 Ph.
3	1000	G.E.	66,000–2300/4000
3	667	Kuhl.	66,000–480
3	16667	G.E.	44,000–13,900
1	2000	West.	44,000–2400, 3 Ph.
3	200	West.	44,000–480
1	5000	West.	34,500–13750/6875, 3 Ph.
2	3000	Stand.	33,000–4160, 3 Ph.
2	1500	G.E.	34,400–2520, 3 Ph.
3	1000	A.C.	34,650/11,550–2300
4	833	West.	33,000–2300
3	200	A.C.	34,500–2400/7200/12470Y
3	75	Wag.	33,000–240/480
1	3000	A.C.	23,380–2500/4330Y, 3 Ph.
3	2000	A.C.	26,400/13,200–2390/4140
3	1250	G.E.	26,400/13,200–2400/4150
2	1500	G.E.	23,000–2400/4800, 3 Ph.
3	100	G.E.	22,000–7200/12470Y
3	50	G.E.	22,000–2300
3	1667	G.E.	13,800–600
1	1000	G.E.	13,800–600, 3 Ph. Unit Sub.
1	600	Stand.	13,200–2300, 3 Ph.
1	450	Penna.	13,200–2400, 3 Ph. Askarel
1	4500	West.	7200–2400, 3 Ph.
3	125	A.C.	6900–2300
3	100	G.E.	4800–120/240
3	1500	G.E.	2300/4000–460
3	150	West.	2400–230/115
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1	750	G.E.	360 A. 12000 V. 3 Ph. STEP
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3— 500 KVA G-E 22000-2300/4000Y
3— 333 KVA Mol 33000-7200/12470Y
3— 333 KVA W-H 13800-240/480
3— 333 KVA Wag 13200-480
3— 333 KVA Mol 2300/4000Y-230x460
3— 250 KVA W-H 22000-72000/12470Y
3— 200 KVA A-Ch 34500-2400/7200
6— 150 KVA W-H 2400-120/240
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Readers Forum

R/W Survey Good Idea

To the Editor:

We are enclosing a completed copy of your survey on right-of-way.

We think that this survey is an excellent idea and we are looking forward to checking the answers received from other companies in order to compare our right-of-way policies with other utility companies.

LeRoy Patterson
Municipal Relations Manager
Long Island Lighting Co
Mineola, N. Y.

To the Editor:

Electric utility companies are facing an ever increasing problem in the acquisition and utilization of major high voltage right-of-ways. "Electrical World" is to be commended for its effort in sponsoring interest in this field. We feel that your right-of-way meeting last year was very worthwhile and are looking forward to this year's meeting.

Roy A. Strobeck
Manager of Real Estate
Commonwealth Edison Co
Chicago 90, Ill.

This year's Electrical World Right-of-Way conference is being held at the Conrad Hilton Hotel in Chicago March 6 and 7. Registration begins at 8:45 am March 6. Advance registration may be made by sending $30 to Electrical World, 330 W. 42nd St., New York 36, N. Y.

Depreciation in Sharp Focus

To the Editor:

I had an opportunity this morning to read the article on impact of accelerated depreciation (EW, Feb. 10, pp 97-100) and I want to compliment you and your staff, particularly Mr. Michael Duerr, on the very efficient manner in which a very difficult subject was brought into sharp focus. After reading the condensed version of the study even I am beginning to understand it.

I hope that the article will stir wider interest in seeking satisfactory solutions to the treatment of accelerated depreciation for tax purposes in a manner which will more equitably spread the benefits within the framework of public utility regulation.

Apparently there has existed a sizeable area of misunderstanding among many of the public utility operations as to the equities involved in the accelerated tax depreciation problem. I also feel that too many companies have acceded, without struggle, to pressure techniques by the regulatory commissions.

We also appreciate the credit line which you gave us.

Malcolm G. Davis
Vice President

Gilbert Associates, Inc.
61 Broadway
New York 6, N. Y.

Boosts for Perforations

To the Editor:

Thank you for tipping me off regarding the Newsletter at the beginning of the "new" Electrical World (see cover, Electrical World, Feb. 13).

My boss, J. K. Flanagan, travels quite a bit and now I can easily tear out this section and mail it to him with other correspondence.

Also I can keep up with what's going on by reading your "capsule" comments.

Emily R. Nelson
Executive Secretary
Florida Power Corp
St. Petersburg, 1, Fla.

To the Editor:

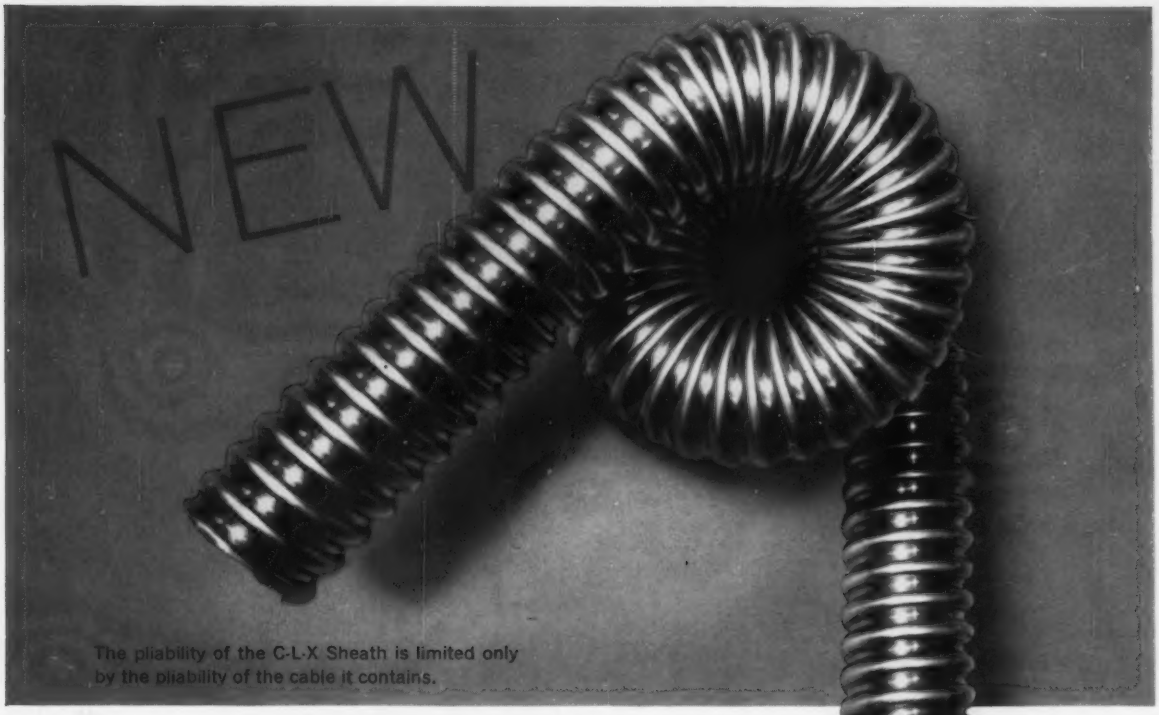
You've made a hit with me! . . . those perforated pages of the Electrical World are an answer to one of the secretaries' many prayers.

Thanks so much.

Ester J. Koss
Secretary to Mr. Dimity
Phelps Dodge Copper Products Corp.
100 West Monroe St.
Chicago 3, Ill.

Simplex

ANNOUNCES the C-L-X* Sheath



The pliability of the C-L-X Sheath is limited only by the pliability of the cable it contains.

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C-L-X provides a completely sealed conduit — with "built-in" cable. C-L-X combines all the advantages of lead sheathed and interlocked armored cables. In addition, it has its own intrinsic qualities of great strength with extremely light weight. It is suitable for installation in trays or by clamps. C-L-X can be used aerially or buried directly in the ground. Its pliability permits ease of installation.

For more than a decade, this type of cable protection has given exceptional service in European installations. *Now, Simplex engineering has adapted C-L-X so that its scope of industrial applications is practically unlimited for modern American installations.* It is unequalled in situations where impermeability and durability are important.

Like all Simplex products, C-L-X is engineered for lasting quality and, therefore, *dependability*. Write for specific product data.

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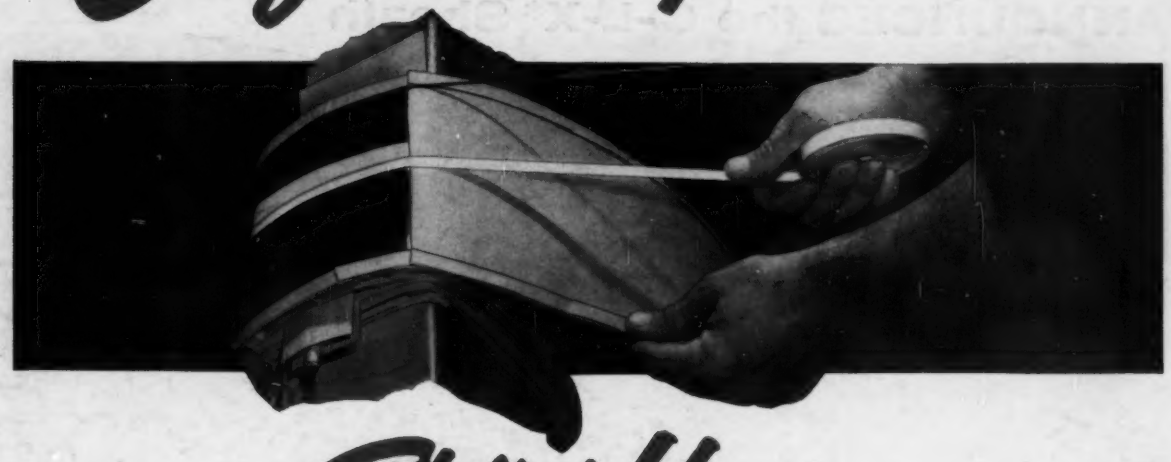
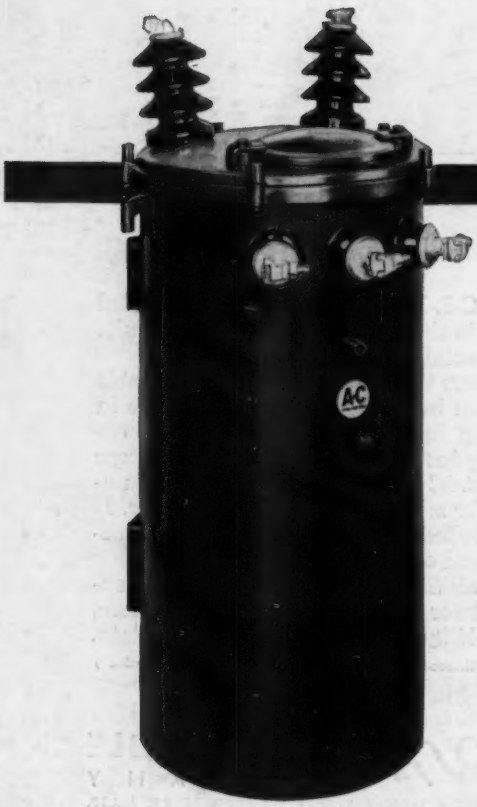


Skilled Hands build long life and outstanding performance into Allis-Chalmers distribution transformers



Start with advanced research and development. Set high standards in design, engineering and manufacture. Work with only the best materials and facilities. Crown your efforts with industry's most rigid quality control program. Give these ingredients to master-craftsmen. This is what Allis-Chalmers does to build long life and top performance into a transformer.

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